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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2021

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

SUBCOMMITTEE ON TACTICAL AIR
AND LAND FORCES HEARING

ON

DEPARTMENT OF DEFENSE TACTICAL AND ROTARY AIRCRAFT ACQUISITION AND MODERNIZATION PROGRAMS IN THE FISCAL YEAR 2021 PRESIDENT'S BUDGET REQUEST

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DEPARTMENT OF DEFENSE TACTICAL AND ROTARY AIRCRAFT ACQUISITION AND MODERNIZATION PROGRAMS IN THE FISCAL YEAR 2021 PRESIDENT'S BUDGET REQUEST

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Washington, DC, Tuesday, March 10, 2020.

The subcommittee met, pursuant to call, at 2:01 p.m., in room 2118, Rayburn House Office Building, Hon. Donald Norcross (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. DONALD NORCROSS, A REPRESENTATIVE FROM NEW JERSEY, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. NORCROSS. Calling the hearing to order. And just discussing the awkwardness whether we shake hands, fist bump, but obviously it is on the minds of many, and certainly for you and the men and women you command, it is obviously a very big issue. Together, we will get through these as we have many others.

Today, the subcommittee will review the Army, Navy, Air Force, and Marine Corps tactical and rotary-wing aviation programs in fiscal year 2021 budget request. We have an extensive portfolio of aviation programs to cover today. As a reminder, that the subcommittee is holding a separate hearing for the F–35 Joint Strike Fighter program. Reminder, so the F–35, if you have to, we can do it here today, but we are having a separate hearing certainly which is going to demand a lot of our time.

I would like to welcome our distinguished panel of witnesses, all eight of you: Dr. Bruce Jette, Assistant Secretary of the Army for Acquisition, Logistics and Technology; Brigadier General Walter Rugen, Director of Future Vertical Lift Cross-Functional Team; Mr. James Geurts, Assistant Secretary of the Navy for Research, Development and Acquisition. Is this seven out of eight times? Wonderful. Good to see you again. Lieutenant General Steven Rudder, Deputy Commandant of the Marine Corps for Aviation; Rear Admiral Gregory Harris, Director of Air Warfare, Chief of Naval Operations; Dr. Will Roper, Assistant Secretary of the Air Force for Acquisition, Technology and Logistics; General Mike Holmes, Commander, Air Combat Command for the Air Force; and Lieutenant General David Nahom, Deputy Chief of Staff for Plans and Programs at Headquarters Air Force at the Pentagon.

Thank you all for your service and especially being here today.

I will be submitting my full statement for the record, but want to take a few minutes, just some areas that we are going to have particular focus on today.

Fiscal year 2021 budget request underlines tough choices ahead of us and highlights even within the contexts of the largest defense budget in the history resources that need to be allocated wisely. The request before us trades current aviation capability and capacity for future capability, calculating the need to lessen our high-end next-gen [generation] systems that will come at the expense of existing aircraft, certainly flying those current steady state and lesser contingency missions.

The Navy's budget proposal removes 36 Super Hornet strike fighter aircraft planned after the 2021 budget and begins to shut down the F/A–18 production line beginning in 2023, increasing the Navy's strike fighter shortfall next year. Further, we need to understand what gives Navy leadership and acquisition officials confidence in terminating Super Hornet's production 10 years before the next-gen F/A–XX strike fighter, and currently exists in briefing slides, is as prudent.

Turning to the Army, Future Vertical Lift initiatives will approach $1 billion in year 2021, with most of the funding accelerating development of the two new aircrafts. Army witnesses should be prepared to explain what measures they are taking to manage cost and risk as aircraft developed in parallel.

With respect to ongoing Army programs, in fiscal year 2020, the NDAA [National Defense Authorization Act] and the appropriations both included $28.0 million in advance procurement for the Chinook Block II long-lead items. Now we have learned that despite congressional direction, the Army has put these funds on hold pending a decision from Army leadership.

I am interested to hear details on the Army's strategy, how to preserve the heavy-lift industrial base. Management of the CH–53K, the heavy lift, certainly is one of great interest. And we are glad to see some of the openness and the feedback that we are getting, so we will get into that. And as the subcommittee continues to work on the 2021 NDAA, we will take a close look at these issues to make sure taxpayer dollars are wisely spent.

Now I want to turn it over to my friend and ranking member of the TAL [Tactical Air and Land Forces] Committee, Ms. Hartzler, for her opening remarks.

[The prepared statement of Mr. Norcross can be found in the Appendix on page 37.]

STATEMENT OF HON. VICKY HARTZLER, A REPRESENTATIVE FROM MISSOURI, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mrs. HARTZLER. Thank you, Mr. Chairman.

I have a lot to cover in a relatively short amount of time, so I will try to keep my comments brief. But first of all, thank you. Thank you all for your service to our Nation. We really appreciate your leadership and being here to provide testimony on the budget request for tactical and rotary-wing aircraft modernization programs.

With flat budgets likely to be the norm, I appreciate all of your efforts in conducting exhaustive program reviews to better align your military service with the National Defense Strategy and the great power competition. I look forward to working together to determine what is the right balance to fund both current tactical readiness and needed modernization required for future readiness. It is within this context that I will highlight a few issues to discuss during this hearing.

Regarding Navy strike fighter management, the chairman alluded to this, it is something I am interested in as well. This budget request, as he said, as you know, removed 36 new production F/A–18 Super Hornets in the outyears that were originally planned for production in last year's budget. Given the Navy's current shortfall of 49 aircraft, I am concerned that this decision is creating too much operational risk in the near term.

Regarding the F–15EX program and Air Force fighter force structure. Last year, during a similar hearing, we heard from you, Dr. Roper and General Holmes, that two-thirds of the F–15C fleet were past their service lives and these planes needed to be replaced now, which is why the Air Force made the F–15EX a top priority. I shared those concerns and agreed with you. And I am concerned that this budget request appears to have removed six F–15EX aircraft from what was originally projected in the fiscal year 2020 budget for fiscal year 2021.

I understand these planes were removed due to higher Air Force priorities. I would like to know what these higher priorities are, since we obviously have a major readiness challenge with our F–15C fleet. I would appreciate the witnesses to update us on the current status of the F–15EX program.

Regarding Army rotorcraft modernization, both the Future Armed Reconnaissance Aircraft and the Future Long-Range Assault Aircraft appear to be making considerable progress and significant down-selections scheduled for this month. That is good news. And I am encouraged by their success to date. I would appreciate an update on both of these programs from our witnesses today.

I do however have some concerns regarding the reduced request for UH–60 Mike Black Hawks, and specifically what impacts this could have on accelerating the fielding of these helicopters for the Army National Guard.

In closing, during our hearing last week on ground system modernization programs, General Murray stated that, quote, no service is able to go it alone. And as history has shown, joint teams win, and modernization is no exception. I would say winning matters, but winning together matters most, end quote. I couldn't agree more. So I would appreciate it if the witnesses could describe how they are coordinating with one another, and look forward to working with all of you and my colleagues in a collaborative manner as we review the fiscal year 2021 budget request.

So thank you, Chairman, for organizing this important hearing. I yield back.

Mr. NORCROSS. Thank you.

And I would ask that each of you keep your opening remarks to 5 minutes per service. We have a full discussion and we have many of you.

So, with that, Dr. Jette, great to have you back. Look forward to your statement.

STATEMENT OF HON. BRUCE D. JETTE, ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY, DEPARTMENT OF THE ARMY; AND BG WALTER T. RUGEN, USA, DIRECTOR, FUTURE VERTICAL LIFT CROSS-FUNCTIONAL TEAM, ARMY FUTURES COMMAND

Secretary JETTE. Chairman Norcross, Ranking Member Hartzler, and distinguished members of the Subcommittee on Tactical Air and Land Forces, thank you for the invitation to discuss the Army's tactical rotary aircraft acquisition and modernization programs for fiscal year 2021, and for this opportunity to appear with our service counterparts.

With me today is Brigadier General Wally Rugen, Director of the Future Vertical Lift Cross-Functional Team. I appreciate, Mr. Chairman, your making our written statement a part of the record for today's hearing.

Aviation is one of Army's largest portfolio in terms of budget and an important element of the joint and organizational and multinational team. Our focus on aviation modernization comprises two parallel lanes of execution: modernization through new platforms and targeted modernization efforts for the current platforms.

My office and my Program Executive Office Aviation, work closely with the Army Futures Command and Brigadier General Rugen's Future Vertical Lift Cross-Functional Team to rapidly develop capabilities to support multidomain operations. Key efforts include the Future Attack Reconnaissance Aircraft, FARA, which is designed to fill a critical armed reconnaissance capability that currently exists in our formation; and the Future Long-Range Assault Aircraft, FLRAA, which is projected to replace the UH–60 Black Hawk with increased speed, range, payload, and endurance.

At the same time, the fiscal year 2021 President's budget request also invests in the readiness and modernization of our current Black Hawk, Apache, and Chinook fleets needed for the foreseeable future.

I would like to take a moment to address our reform efforts. The Army continues to implement initiatives granted by Congress in order to streamline and gain efficiencies in our acquisition process.

Specifically, aviation has been playing a key role in implementing the Army's intellectual property policy, which stresses identifying and planning IP needs early in the life cycles of any system. And PEO [Program Executive Office] Aviation is participating in Program Management Resource Tool, PMRT, a pilot program which captures and manages our program data across the enterprise to enable real-time analysis and data-driven decisions. This will further ensure Army senior leaders have the information necessary to make well-informed decisions on Army programs.

Mr. Chairman and distinguished members of the subcommittee, we are grateful for your strong and steadfast support for our soldiers and our soldier aviators, as well as our Army civilians and

their families. Thank you for the opportunity to appear before this committee, Mr. Chairman. We look forward to your questions.

[The joint prepared statement of Secretary Jette and General Rugen can be found in the Appendix on page 41.]

Mr. NORCROSS. Thank you.

Mr. Geurts.

STATEMENT OF HON. JAMES F. GEURTS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT AND ACQUISITION, DEPARTMENT OF THE NAVY; LTGEN STEVEN RUDDER, USMC, DEPUTY COMMANDANT FOR AVIATION, HEADQUARTERS U.S. MARINE CORPS; AND RADM GREGORY HARRIS, USN, DIRECTOR, AIR WARFARE, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

Secretary GEURTS. Chairman Norcross, Ranking Member Hartzler, and distinguished subcommittee members, thanks for the opportunity to appear before you today to address the Department of the Navy's fiscal 2021 budget request. Joining me today from the Department of the Navy are Lieutenant General Steve Rudder, Deputy Commandant for Aviation, and Rear Admiral Greg Harris, Director of Air Warfare. With your permission, I intend to provide a few brief remarks and submit a statement for the record.

We thank the subcommittee and all of Congress for your leadership and steadfast support. Your efforts to fully fund the fiscal 2020 budget provides the stability and predictability and funding that enable us to build and sustain the naval aviation force that the Nation needs so we can execute the maritime component of the National Defense Strategy.

In 2019, the Department delivered 125 new manned aircraft and 15 unmanned air systems to the Navy and Marine Corps, with a plan of delivering an additional 125 aircraft this fiscal year. As we continue to modernize the fleet, we have also focused on aviation maintenance, delivering higher aircraft mission-capable rates, reducing maintenance backlogs, and enabling our maintainers to do a better job of supporting our fleet.

The Department achieved our goal of an 80 percent mission-capable rate for the F/A–18E/Fs and EA–18Gs in October 2019, and periodically throughout 2019 for the Marine tactical aircraft. We are committed to maintaining and expanding these systematic improvements.

Our 2021 investments build upon these initiatives in order to lever a ready, capable, and global sea-based and expeditionary force. Our vision is to provide the right capability in the hands of the warfighter on schedule and in the most affordable manner possible. The fiscal year 2021 budget procures 121 aircraft with 537 aircraft across the FYDP [Future Years Defense Program], increases depot maintenance and logistics funding, increases our flying-hour program, and continues to make investments in many key Navy and Marine Corps development programs to ensure readiness for the future fight.

Additionally, our 2021 budget makes focused investments in our fleet readiness centers, enabling the procurement of more modern equipment and implementation to process and workflow improvements, similar to what the Navy is doing in the public shipyards.

Minimizing the risk of physiological episodes [PEs] continue to be the naval aviation's top safety priority and will remain so until we understand and mitigate all causal factors. We have reduced PE for legacy Hornets by over 80 percent and seen similar improvements in the T–45 aircraft. In January, we had zero F/A–18 PE incidents, the first month with zero since the summer of 2011. The Department will continue to work to drive PEs to the lowest possible level.

Naval aviation operates forward near our potential adversaries' home shores. We thank you for the strong support this subcommittee has always provided our sailors, our Marines, and our families. And we thank you for the opportunity to appear before you today. We look forward to answering your questions.

[The joint prepared statement of Secretary Geurts, General Rudder, and Admiral Harris can be found in the Appendix on page 51.]

Mr. NORCROSS. Thank you.

Dr. Roper.

STATEMENT OF HON. WILLIAM B. ROPER, JR., ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS, DEPARTMENT OF THE AIR FORCE; GEN JAMES M. HOLMES, USAF, COMMANDER, AIR COMBAT COMMAND, HEADQUARTERS U.S. AIR FORCE; AND LT GEN DAVID S. NAHOM, USAF, DIRECTOR OF PROGRAMS, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR PLANS AND REQUIREMENTS, HEADQUARTERS U.S. AIR FORCE

Secretary ROPER. Chairman Norcross, Ranking Member Hartzler, distinguished members of the subcommittee, thank you for the opportunity to be here today to testify on this important topic. Aviation is the key to winning on the battlefield. Air superiority is the hallmark of our military, and we are committed in the Department of the Air Force to keep it that way. I am delighted to be here with our distinguished colleagues from the services and to share this hearing with General Holmes and General Nahom, who are great wingmen in trying to modernize our future Air Force.

The National Defense Strategy makes it very clear that time matters. We have a capable adversary, capable adversaries, China and Russia, who can match us technologically, and in the case of China, economically. So the need to modernize the force while we have a window of opportunity and divest legacy assets that are draining our resources that could go into advanced warfighting capabilities could not be a more important nor timely topic.

We know that we have to provide 2,100 fighters to meet the needs of our combatant commanders, along with all the support equipment, training, and other systems, such as combat rescue, that enable those fighters to be a fighting force at the future edge of battlefield. We are focused on doing that in the Air Force. We are focused on training pilots better using technologies like AI, artificial intelligence, tailored training so that pilots get through the training pipeline faster and are able to take on combat duties.

But we are focused on far more that just what we buy and how we modernize. We care about the speed at which we do it. We are very thankful for authorities that you have granted and championed, things like section 804 that allow us to get on contract fast-

er with industry, do more prototyping, which is just flying before you buy so that we can remove time from our programs and deliver faster for the warfighter. To date, we have removed approximately 125 years from traditional programs, and we look forward to continuing to drive speed and delivery.

Modern practices in software development are also helping us bring greater lethality to the edge. Practices like DevSecOps or agile software development are fundamentally changing how fast we can modernize systems and keep them relevant. Even though we may talk about the airplane, the software on it is an increasingly important part of its lethality. We have to modernize it at the speed of need.

We are excited about new technologies like digital engineering that will change the way in which we build and design systems and modernize future systems that we don't have today. We look forward to sharing those with you both in this open hearing and in a closed setting.

We thank you for the focus that you put on supporting the Department of the Air Force, our airmen, and their families. We thank you for your time today for this hearing. Our time matters when we have a capable adversary. In the Department of the Air Force we try to make every year, every budget count. We look forward to sharing with you the highlights of this budget today.

[The joint prepared statement of Secretary Roper, General Holmes, and General Nahom can be found in the Appendix on page 79.]

Mr. NORCROSS. Thank you for your statement.

So, Dr. Roper, let me just start with a couple of comments, because it is indicative across all the services. Window of opportunity, why is now that window and it wasn't 2 years ago or 2 years from now? And the second question, in your statement—or in your testimony, you talk about being embraced by the Secretary of Defense goal of irreversible moment. Why is it, A, irreversible at this moment and—hasn't happened before, because obviously we have made changes. And why is now that window of opportunity?

Secretary ROPER. Chairman Norcross, if we had our druthers, I think we should have started this pivot a couple of years ago. And I think many of you I have worked with in past jobs focusing on peer competition high-end warfighting. It is a significant challenge today. If you go back to the Cold War, we were generating most of the technology that found its way to the battlefield. We were the major generator of technology in the world. And now we live in a world where the Defense Department is only 20 percent of the R&D [research and development] that happens in this country. We live in a world that is technology rich. And so that should give us both concern, but also, you know, a lot of appeal, because we live in a time where we can pull things into future warfighting systems.

China has been modernizing, looking at how our military operates in the Middle East. It has been on display, our playbook has been understood. The counters have been done. And if we continue to build the same kinds of systems and fight the same kind of way, we are playing into their hands. Playing into a fight that they understand and know how to counter. So the reason that now is the time is that if we simply wait until the fight happens, we won't

have the time to build new systems, new training, new techniques so that we retain the overmatch that we have enjoyed.

Mr. NORCROSS. So you are suggesting the risk is less now is why that window is open?

Secretary ROPER. The risk will always be less now than waiting. We have to start now to create options for the future.

Secretary Esper's comment of making the National Defense Strategy irreversible I think is simply moving the portfolios of the services to focus on high-end warfighting. The capabilities that we can build to take on a peer, the training that is needed to take on a peer can be taken into the uncontested environment and to low-intensity conflict, but you can't take low-intensity conflict into the peer fight. And so this pivot towards irreversibility is getting our portfolios properly modernized so if the Nation calls upon us to project power in a contested environment, we will have options for the commanders to do that.

Mr. NORCROSS. Thank you.

So, Admiral Harris, let me shift things over to the Navy here. And in my opening remarks, we talked about the 44 strike fighters change per air wing, does not include attrition of the aircraft. Obviously, every time something goes into the maintenance depot, we find things out that help educate us, whether it is corrosion or otherwise. So can you explain to the committee why the Navy does not plan for attrition of the reserved aircraft in the carrier wings? And what risk is involved in that?

Admiral HARRIS. Sir, there is risk—thank you for that question—in the attrition aircraft, but it is a balanced mix for the Navy as we looked across the number of combat-coded aircraft that we need to be able to meet that high-end fight for those nine carrier air wings. That balance comes in the result of ensuring that you have enough in depot maintenance that are coming out ready to be forward deployed with the forces while we bring the others back into the service life modification program. So it is a balanced risk that we are taking right now based on the current budgets.

Mr. NORCROSS. So I know my ranking member is going to have a lot of questions on the F–18, but I want to talk about what has happened recently with the first two Super Hornets coming into service life maintenance found a tremendous amount of corrosion. I can't say areas it was not expected, because the maintenance schedule suggests that we should do things to protect those. And here we are blowing the budget out, the time out.

A, what are we doing to prevent further problems? And are those first two aircraft the most difficult ones or are we going to fall into this? And what are we doing to change it so we don't face this sort of thing?

Secretary GEURTS. Yes, sir. I think it is a combination of factors. One of the factors is we are finding more corrosion on the airplanes. And I will ask Admiral Harris to talk about what are we doing on the operational fleet to get after that so that we can not get the corrosion and have to pull it out to the extent we are.

The other thing we changed a little bit in the SLM [service life modification] program is we have added a bit to it so we deliver a fully mission-capable airplane out of SLM. In other words, we bring in all the phase maintenance checks. So when we hand it

back to the wing and the squadron, it is ready to go. Previous service life extension programs have just, you know, done things for the airplane but not taken advantage of the fact we had the airplane all pulled apart.

The third piece is working closely with Boeing to productionize this service life extension. In other words, not get every airplane being its own custom, artisan activity. We need get that into production flow. So some of the risk of shutting the F–18 down, line down, after 2021 will be taking advantage of that line to productionize, to get to our goal of 40 airplanes a year through that SLEP [service life extension program] line.

Mr. NORCROSS. So let me ask you while you are on that, the first two picked out and we found the corrosion much worse. Are we anticipating that to continue or are you expecting that to drop? And what have you done to rectify the budget and the time schedule?

Secretary GEURTS. Yes, sir. Twofold, we are working on our maintenance on the flight line and our procedures on the flight line using best practice out of commercial aviation to reduce exposure to corrosion, only open it up once, button it up, as opposed to open it up many times. And then I expect over time as that gets into the fleet, that component of uncertainty will drop down.

Mr. NORCROSS. Admiral Harris, did you have anything to add?

[Audio malfunction in hearing room.]

Admiral HARRIS. Just to add, maintenance reset right now looking at a line all of our inspections to try to prevent, to the Secretary's point, opening a patient more than we need to. So we don't have to perform an inspection, we don't have to open an area and expose it to the elements and perhaps not put the corrosion [inaudible] back in as we are putting it back together. We are going to cut down on that.

The second thing we are doing for all the aircraft as they are coming in the SLM line 6 months [inaudible] what areas we need to work on so the fleet can work on those areas prior to the aircraft entering SLM.

Mr. NORCROSS. So maybe you can explain. As we understand it, from the manufacturer there are certain processes that were supposed to take place. And what they suggested, the way of fixing it, were the ones that were suggested, they weren't followed. So, A, not so much why wasn't it followed, but have we corrected those actions? And why haven't they followed the manufacturers' suggestions?

Admiral HARRIS. Sir, I think what we will find, Chairman, is that as we perform maintenance on the aircraft, frequently we are adding inspections as we see things that we think we need to do. So it is oil-changing your car more frequently than the manufacturer recommends. So you are opening panels more frequently. As we can align all of those inspection cycles and prevent that, the idea will be to open it less frequently, more along the lines of what we should be doing. And then the other piece gets down to using the precise material when you are putting corrosion prevention on the surfaces prior to putting them back together. We need to get back to the correct material.

Mr. NORCROSS. We don't want to get too deep in the weeds, but closing up the proper way. It is not the opening, it is the resealing that is the problem.

Admiral HARRIS. Yes, sir.

Mr. NORCROSS. Thank you.

Dr. Jette, our Chinook, we put in there last year the idea of the advanced procurement. As we understand it, that is still is in the same position as we put it a year ago. That is the first question. The second one is minimum sustaining rates, whether it is 24, 18. The answer a year ago was we needed a robust program that—more speed for the future, more weight.

When we look at the program, the way that we are hearing you say it, that foreign military sales is going to bring up that minimum sustaining rate. Right now, I think there is only one that has been signed and one potentially. First, give us an update on foreign military sales that can feed the beast, shall we say, of keeping that line running. And then I have a followup.

Secretary JETTE. Yes, sir. So I will start with the foreign military sales. On the foreign military sales, we are able to maintain the minimum sustaining rate. So we worked with Boeing on minimum sustaining rate and the one defined that we both agreed to——

Mr. NORCROSS. Is how many?

Secretary JETTE. Eighteen.

Mr. NORCROSS. Okay.

Secretary JETTE. And 18 is one shift a day, 8-hour day, 5 days a week, throughout the year. The minimum sustaining rate is 18. We have orders in place for out to 25, we believe, were at those minimum sustaining rates.

Mr. NORCROSS. Really?

Secretary JETTE. We have moved some of our ORF [operational readiness float] deliveries just to the right, which lets us make sure that we fill in some of the gaps. We have an LOA [letter of offer and acceptance] waiting signature with the U.K. [United Kingdom]. We are pretty confident that that will follow through. They are going through their current budget works as well. We expect that by October. That is very promising.

We also have visibility on direct commercial sales, so that sometimes what happens is we make our counts based purely on the number that are being produced for foreign military sales, which is separate from direct commercial sales. Some countries do direct commercial sales. Some countries want to go through the foreign military sales and leverage some of the training and things you can get, sustainment that you get through the FMS.

So the Netherlands has on contract through direct commercial sales six new builds for Block Is; delivery in 2021. We have Singapore is on contract for direct commercial sales for eight new builds as well. And we have laid these out with respect to the profiles.

Mr. NORCROSS. In the interest of time, we will get the actual numbers, but they are going to meet the minimum sustaining rate?

Secretary JETTE. Yes, sir. Out to 2025 is where we think we are good.

Mr. NORCROSS. Okay. In the second round we will get back to it.

Mrs. Hartzler.

Mrs. HARTZLER. Thank you.

Just to pick up on the F–18 questions that my colleague started with there. So first of all, would you affirm that we have a 49 airplane shortfall right now?

Admiral HARRIS. Yes, ma'am. That is correct.

Mrs. HARTZLER. Okay. And that is one carrier wing. And you confirm that we are having—you are suggesting this budget to cut another 36 Super Hornets out that were projected to be built, but now you don't have them?

Admiral HARRIS. That is correct, ma'am.

Mrs. HARTZLER. Okay. I know you said that it was a balance risk. I feel like this is too much operational risk. And I want to get some clarity on as you talk about the service life extension and maintenance. So how are you addressing this shortfall? It sounds like you are just going to maintain and rehabilitate the current ones, is your plan?

Secretary GEURTS. Yes, ma'am. And again, the transition risk between fleets is always where we are at most risk. And so our 2021 budget fully funds the F–18 production at 24.

Mrs. HARTZLER. Future life.

Secretary GEURTS. That gives us some time—we, again, made some hard decisions on F–18. As the SLM line comes up towards our goal of being able to take 40 airplanes into that line a year, we can understand the balance of that risk. And as we brought the mission-capable rate of aircraft up across the Department of the Navy, that gives us additional up aircraft to help balance that shortfall. So it was an affordability balance. We are trying to work the balancing act again fully funding the 2021 that 3-year multiyear so that we can continue to watch that this year and ensure the decisions we made in 2021 reflected in 2022 out budget balance that risk appropriately.

Mrs. HARTZLER. So you are cutting into the outyears 36 aircraft, then you are going to pull in 40 that are currently flying, into maintenance. How long does it take to go through the service life extension?

Secretary GEURTS. Right now, we are at about 18 months. When we get at full rate, our goal is to do that in 12 months.

Mrs. HARTZLER. So if you add all those up, this is a severe shortage that we are experiencing. And then if you don't count for the attrition rate actually in combat, we would have a very large gap there, potentially?

Secretary GEURTS. Yes, ma'am. We are taking this risk until the end kind of late 2020s. I think 2029 is when we will get to the full fighter inventory. So we have had to take some risk as we balance that.

Mrs. HARTZLER. Sure. General Rudder, as you heard that the Navy has this shortfall of 49 aircraft, but it doesn't account for attrition potentially, does the Marine Corps have a similar shortfall in strike fighter fleet? And if so, can you describe the shortfall and how it is being mitigated by the Marine Corps?

General RUDDER. Thank you, Congresswoman. Since the Navy divested of their legacy Hornets, we actually have a lot of Hornets that we are kind of sorting through to configure with the best of breed, the higher lot numbers, if you will. So, you know, for Hornets, we have 275; we need about 100, 143 on the flight line. So

we have enough Hornets. We have enough carriers, even though they are down around 123.

What the challenge for us is is the transition. When I say we have 18 squadrons amid the ongoing deployments that we have, we have squadrons coming and going from Asia right now, coming back from the Middle East, and F–35s and AV–8Bs in the ship as we speak.

The challenge would be to maintain a 20 F–35 buy a year at least so we can stand up at least two squadrons a year as we go forward. So as we stand down a squadron, there is going to be a dip. Out of our 18 squadrons, we will have 16 available, if you will. But this transition will be probably the most challenging for us. Not that we will have less jets; it is just transitioning out of our old jets into the new ones to make sure that procurement cycle stays at 20 a year.

Mrs. HARTZLER. And there will be training that needs to go along with that too since you are switching aircraft and all of that. So it is not just an easy transition.

General RUDDER. It is not. That is why, you know, at every given year, you have two squadrons in a transition. It is training the maintainers, training the pilots to be ready to deploy, because much like anything else, as the ship mods come to being with our amphibious shipping capability, we are putting F–35s out there, to include the [HMS] *Queen Elizabeth* [British aircraft carrier]. So we are training people on multi-fronts to not only deploy on the carrier with the Navy, but also deploy our amphibs and other commitments around the world. So it is an ongoing in stride transition for the F–35.

Mrs. HARTZLER. Great. Thank you very much. I have some others, but we will come back a second round.

Thank you, Chairman.

Mr. NORCROSS. Mr. Gallego.

Mr. GALLEGO. Thank you, Chairman.

General Holmes, on February 27, we received word that the Air Force was changing its retirement plan for 44 A–10 Warthogs. Unfortunately, that change plan didn't reach Chief of Staff of the Air Force in time for him to add this to his testimony on March 4. Can you comment on what the new new plan is now?

General HOLMES. Yes, thank you, Congressman. Between General Nahom and I, we will work the numbers, and I will kind of talk about the impact, if that is okay. So as we brought our budget forward, we are trying to balance the need to go forward with fifth-gen aircraft, keep a fourth-gen balance, and conduct all the roles that the Nation expects us to do. All around the world, then, as we balance that force and we look at rebuilding it, we wanted to come through and maintain seven squadrons of A–10s, which is enough for us to have one overseas in PACAF [Pacific Air Forces] that is stationed there, and then have six that can be rotationally available. We keep about one squadron of A–10s deployed in the CENTCOM [U.S. Central Command] area of operations to meet the requirements there. And with those numbers, we can still meet those requirements. We can do the wing upgrades that are required to keep the A–10 useful. And we can bring all of the A–10

fleet up to the same configuration so that they are all just as capable. And General Nahom will talk about the numbers.

General NAHOM. Congressman, so for the A–10, as we work ourselves through the F–35/A–10 comparison testing, we know the restrictions on the retiring. We are watching——

Mr. GALLEGO. Just to interrupt you there, General. Actually, I want to bring that up. So we have the requirements. The report is supposed to come out when?

General NAHOM. We are expecting a report in the early fall, sir.

Mr. GALLEGO. Okay. So the Air Force has decided to retire A–10s, over our own objections here. What is the point of the report? You guys kind of made decisions before the report came out and came back to us.

General NAHOM. Sir, that is our plan. We fully intend to comply with the law about when we can retire the A–10s, but right now, we are planning for the next phase of the A–10. Because when we get past the comparison testing, when we start using F–35 for many of the high-end missions that we are planning on——

Mr. GALLEGO. I guess the point I am trying to make is that it seems prejudicial that you guys already made decisions or planned the future of the A–10 without showing us the report so we can have our input, you know, about the comparison between the F–35 and the A–10. Do you see how that will look on our behalf, how we see things?

General NAHOM. Yes, sir. And we are working very closely with DOT&E [Director, Operational Test and Evaluation] on the report, not only that, but the IOT&E [initial operational test and evaluation] for the F–35, because it is very important before we go forward with next phase of the A–10. But what we need from the A–10 moving forward is we still need that airplane in service. We just have to make sure that the A–10s we keep we upgrade, not only with new wings, with a new digital backbone in the avionics to make sure this can be an aircraft that we can use very effectively in low-end conflict for the next 20 years. And we think that is actually a pretty good news story for the A–10. We intend to make sure we get those numbers right.

Mr. GALLEGO. Back to you, General Holmes. I guess the bigger question is—we could argue back and forth whether we are doing this report correctly, in the right manner—but how did this plan basically evolve to the point where, you know, in my opinion, it seems to be predetermined, without any input from Congress? Specifically, if you look at the history of the A–10 in Congress, it has had consistent bipartisan support. So for many of us here, it was quite surprising that some of the Air Force showed up with this plan. That was the first time we had heard about it. There wasn't any other type of input, especially from the authorizers on this side.

Admiral HARRIS. Sir, I am going to again defer that question to the Headquarters Air Force. I think our goal in our combat command, as General Nahom said, was to make sure that all the A–10s we kept for another 20 years were useful and it could continue to do what they do on the battlefield well. As far as the decisions at the Headquarters Air Force, I will defer that to General Nahom.

General NAHOM. And, sir, as we looked at the A–10 numbers, as we look at all our fleets, we are very keen on making sure we balance the risk across all our portfolios. We want to make sure we have enough of the modernized fighters, the F–35s, for the high-end fight, as Dr. Roper alluded to in his opening comments. And having that balance——

Mr. GALLEGO. I mean, I understand that, but, you know, most of our fights still right now are not high-end fights. We find ourselves more doing close air combat support more than anything else.

And thank you for your time, gentlemen.

Mr. Chairman, just want to note, as I said to General Goldfein last week, for me, the fact that I think the process was just tossed aside from the 2017 NDAA, it is just—you know, for me, it is quite galling. And I really would hope that the committee would work with me to ensure that, you know, we don't allow Congress' voice to be not heard again.

Thank you.

Mr. NORCROSS. Comments are noted. Thank you.

Mr. Banks.

Mr. BANKS. Thank you, Mr. Chairman.

I want to ask the panel about the Future Long-Range Assault Aircraft. Last year, you requested and Congress appropriated funds to accelerate the program based on significant testing progress. Secretary Jette and General Rugen, could you give us a picture of where testing currently stands for the program?

Secretary JETTE. Yes, sir. Thank you for the question. I think what we saw with the request that was made and supported by Congress last year really set the conditions for a 4-year acceleration from where we are currently in tech demonstration to a program of record and a full weapon system. So what happened last year was a great year of successes as we made it through our analysis, as we made it through CAPE [Cost Assessment and Program Evaluation] sufficiency. And we saw both tech demonstrators fly. We wanted to double down on that success, and we needed that help to basically in this budget you see a 4-year acceleration.

Mr. BANKS. Mr. Secretary.

Secretary JETTE. What we are doing, sir, is we are taking—we have looked at the successes of the FLRAA. We are looking at the flight capability of both aircraft at this point, and we have begun putting together the final formal plan to move to a flight—full program of record. The conceptual design and requirements for a full acquisition strategy will be completed by next year. We will then determine contract award in fiscal year 2022 and with FUE [first unit equipped] in 2030. It looks so far since we have seen six promising, and you can go down and watch the aircraft fly both of the versions right now.

Mr. BANKS. So it sounds like both of you can reassure this committee that the program will meet the accelerated timeline.

Secretary JETTE. At this point, we believe so. Yes, sir.

Mr. BANKS. Are there any particular performance metrics that you consider to be indicative of future success in the program?

General RUGEN. I think we had an independent tech readiness assessment by OSD [Office of the Secretary of Defense] last year

where they named nine technologies that were risk areas that we needed to burn down. We fully understand those risk areas. Some of the most prominent are the full authority fly-by-wire flight controls, the drivetrain, the powertrain and the like. And again, because we got that report early, probably years earlier than we normally would have, we are already in our next phase driving that risk down.

Secretary JETTE. Yes, sir. And I would like to add, so elements of overmatch that we see on the aircraft is reach—one of them is reach. It has got three subcomponents: speed, range, and endurance. Both aircraft have significant improvement over what it's fundamentally replacing, which is OH–58. It does have a lethality component, which was very limited on the OH–58, but it will be much more flexible on this version, and the survivability of the aircraft. Because of the integrated ecosystem, in other words, these aircraft are intending specifically to be able to work together and understand the air picture, it will give them an increased survivability by knowing where air defenses are, where radars are, how to use the NOE, nap-of-the-earth, flights and mask from different systems. So we are bringing all of these things to bear in trying to make all of these actually, the FLRAA, FARA, and see how much of that we can push into our existing systems.

Mr. BANKS. Let me finish by just asking, do you anticipate anything that might alter the current timeline or provide an opportunity even to accelerate the testing in this budget cycle or future cycles?

Secretary JETTE. Sir, I think that being an acquisition person who has actually had to build stuff and put on the field, I think we are about as aggressive as I am prepared to go at this point, but I think it is still well within reason that we can get there by 2030.

Mr. BANKS. Thank you very much.

I yield back.

Mr. NORCROSS. Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman. And thank you to all the witnesses that are here today.

Lieutenant General Rudder, I just want to spend a minute just to catch up on the CH–53K heavy-lift replacement program. Last year, I know we went back and forth with some reprogramming issues regarding the exhaust gas reingestion problem, which is one of the most unpleasant sounding terms I think we have ever heard here. But it does seem like that issue has been sort of worked through. And I was just wondering if you can sort of give us an update as far as how that stands right now. And then I just have another question after that.

General RUDDER. I will begin, but I have to thank Secretary Geurts sitting next to me that they really did a great job of putting the package together. We had 126 deficiencies. One was the gas reingestion. They fixed that. I know there is some concern about where the budget is this year. We put seven in there because it wasn't fixed yet and he had not signed off on it yet, so we just put seven in. But we plan on ramping up from there. But the testing is going well. We've got 1,700 hours on the airframe itself. By this fall, we will have our first operational airplane flying in New River.

And by next year, we will have our first four operational airplanes flying in New River, and we have got our first squadron on contract. So, right now, it is on track and going very well. I have got to thank the acquisition community for putting it on track.

Mr. COURTNEY. Well, I think you are right. Actually, Mr. Geurts was deeply involved in terms of trying to work that through with the Appropriations Committee. And I am glad, you know, we had a good ending to that.

Again, you sort of alluded to the fact that, you know, now we are pretty close to going to a higher production rate than low rate. I mean, can you give us kind of a horizon in terms of how you see that moving forward?

General RUDDER. Yeah. We put in seven. I mean, you see 11 the following year. We are hoping, you know, we can stay at that. We are hoping the budget stays, you know, where it is and it is acceptable. But obviously we would like to get higher. The higher the numbers, the greater the learning curve from production. And as we saw with the F–35, the greater the cost curve, as we saw the F–35, as you ramp production, cost curve came down. We can already see a cost curve beginning to take a turn with the 53K. So I think increased production will bring that cost curve down more efficiently.

Mr. COURTNEY. Mr. Geurts, did you want to add anything?

Secretary GEURTS. No, sir. I would agree with "Stick." I mean, a couple of good things. We negotiated that production contract, so any of these fixes will go into the production aircraft so we are not handing the field an aircraft that doesn't have the fixes in, which I think is important. That also means we can accelerate production. And so with the fixes already in, we will accelerate that production ramp to get it as most efficient as possible.

Mr. NORCROSS. Thank you.

Mr. Lamborn.

Mr. LAMBORN. Thank you, Mr. Chairman, for having this hearing. Thank you all for being here and what you do for our country.

General Holmes, could you provide the subcommittee with an update that is appropriate for an open setting like this on where we believe Russia and China are with their fifth-generation aircraft production?

General HOLMES. Yes, sir. Thank you. I will do my best. We believe that China is in front of Russia in their ability to build an airplane that matches the capabilities that we can. So the J–20 is the airplane that we talk about. In China, they have shown they can build it. They haven't shown yet how many they can build and whether they can build it in numbers, but you wouldn't want to bet against China being able to do that. So they have a small number of airplanes that are close to par with our capability to build.

The Russian airplane that compares is not as far along on the fifth-generation ladder as what China is building. It is a capable airplane, we believe, but they haven't shown the ability to build it in numbers yet. They continue to run into production problems and cost problems, we believe. And so I am more concerned with China's ability to build a peer aircraft and to produce it in mass numbers than I am with Russia at this time.

Mr. LAMBORN. Okay. Thank you. And then also, General Goldfein testified last week that the Air Force is short about 2,000 pilots. Can you discuss any efforts by the Air Force to accelerate pilot production and experience, and especially in the area of fifth-generation pilots?

General HOLMES. Yes, sir. Again, thank you. We have several efforts going on. It starts with trying to make sure that we offer a place where our young aircrew and all our operators can find meaning and purpose enough to stay in this career for the long term in the face of, you know, competing economic opportunity somewhere else. So it starts with trying to build an Air Force that they want to stay in for the long term and talking about the importance of what they do.

The next place is production. We know that to make up that 2,000 pilot gap, we are going to have to produce more pilots every year. So my colleagues in Air Education and Training Command have been ramping up production every year, both maximizing the use they have with the legacy equipment, the T–6, the T–38, and the T–1, and then looking for new ways to produce pilots better and faster, like Dr. Roper talked about, through Pilot Training Next, now kind of pilot training 2.0, and to see if we can produce a better pilot faster using new techniques. And we believe that we can. Right now, most of our pilots are still trained very close to the way we trained them in 1947, and certainly very close to the way we trained them in 1981 when I went to pilot training; same number of hours, same number of syllabus requirements, doing it the same way. And we believe that we have the ability to speed it up and make better pilots.

Mr. LAMBORN. Thank you. Thank you for all being here and for the answers to those questions.

And, Mr. Chairman, I yield back.

Mr. NORCROSS. Thank you.

Mr. Golden.

Mr. GOLDEN. Thank you, Mr. Chair. Thank you to the panel for being with us today.

Good to see you again, Secretary Geurts. It has been a couple of days.

General Rudder, I just want to give you an opportunity to talk a little bit about the Commandant's future design for the Marine force and how that is going to impact your plans for aviation force structure, comp [component] and total aircraft inventory requirements. You know, just looking ahead a little bit, what can you tell the subcommittee about what to watch for?

General RUDDER. Yeah. I don't have an exact number. He is actually walking the hallways as we speak briefing up different leaders in the building. I will offer that, you know, one of the challenges we have with force design to switch to a major competitor is to pull ourselves out of most of the operations we are doing around the world. I think it is the same for all my partners at the table here. So that will be the challenge on what we do, because in some cases, we have aircraft there in places that we kind of like to use them somewhere else. So being able to focus on the Pacific with what the Commandant wants to do and his force design will be based a lot in part upon that and how much risk we assume.

I would offer that in all the aviation you heard them talk about 200 53Ks. He has openly said that in these particular forums. And all the different force design elements, aviation plays a key role. I guess I will stop at that.

Mr. GOLDEN. That is all I have. The next thing I was going to ask was about how the CH–53K figured into that new force structure. So you got right on it. Thank you very much. I appreciate it.

Mr. NORCROSS. Thank you.

Mr. Bacon.

Mr. BACON. Thank you, Mr. Chairman. And thank you all for being here today.

And I just want to point out it is a pleasure to see General Holmes, who I worked with 7 or 8 years ago on the sale and the integration of the RC–135 to the RAF [Royal Air Force] and the F–35. So it is great to see you back.

My first question is to Dr. Roper and General Holmes. A few years back, we cut the Joint STARS [Surveillance Target Attack Radar System] and we moved that money to help fund the future of the ABMS [Advanced Battle Management System]. I see in this budget we are also making major cuts to the Global Hawk, to the Reaper, I think again to move funds to the ABMS. We also heard this past week and last week how important to the Army and the Marines the long-range fires are and integrating that. And they rely on ISR [intelligence, surveillance and reconnaissance], the Air Force ISR to do that.

So really my question is to Dr. Roper and General Holmes, what is the timeline to get ABMS operational? When is the combatant commander going to start getting data off this ABMS? What is the future of MTI [moving target indicator] or the moving target—the capability, the ISR capability that is in high demand, what are those timelines? Thank you.

Secretary ROPER. Thank you, sir. I will talk to how we are going to do it, and I will turn it over to General Holmes for what the operational impact will be.

So the Advanced Battle Management System is going to challenge everything about how we bring capability to bear for the warfighter. It is really—it is a stark contrast when you leave your personal life and then you go work in a military organization. You leave a personal life where you are connected to almost everything, analytics push data to you that you don't have to request. You interact with it, it allows those analytics to improve. So decision at machine speed is something we really need to fear, because if we face it on the battlefield, it is one technology that might negate the human advantage that we currently enjoy. So what we have to do in Advanced Battle Management System is build the Internet of Things but where the things are military systems—so fighters, ships, soldiers—that are pushing data to that centralized infrastructure but that are also getting data pushed to it.

Mr. BACON. [Off mic.] From what I understand, the timelines is what scares us.

Secretary ROPER. It is. If we do this as a traditional acquisition program, I will already tell you it has already failed, right. It is too big, it touches too much. So the way we are doing it is pushing out capability in 4-month cycles. If we let it go further than that, we

are not moving in internet speeds and we are injecting too much risk. So the idea is having multiple activities that have to come to bear and live fly. The first one happened in December. We connected the F–22 and the F–35 for the first time. That is great. That is not the capability we want to have a year from now, but it is the first step, and it allowed us to retire the risk, learn, and give better data to our engineers to iterate.

We are going to do another activity in April, bigger, better, with the way we connected the F–22 and the F–35, rather than being something that is on the ground, we are going to fly it on an attritable drone. So we take that next evolution.

The best advice we got from people that built the internet is do it in rapid iterative spirals, fail very frequently, and ensure that risk is retired and given back to engineers so that you can deliver capability in 15 percent slices. And the 15 percent slices got my attention, because we typically talk about 80 or 90 percent solutions at the end. Their point was design it so the slices stack towards greater capability, but don't wait on delivering to the end. And so we are going to continue that through the program, sir.

[Audio malfunction in hearing room.]

Mr. BACON. [Off mic, inaudible.]

Secretary ROPER. Sir, the biggest risk is if we don't succeed on ABMS, if we cannot bring internet-type connectivity to the military, we have already failed. We will face adversaries who can fight at machine speed and we won't. We have to have those things like cloud and software to find networking and mesh ad hoc networking to move data the way the internet does. So we cannot fail on ABMS.

To your question about divesting legacy assets, a lot of things we will need to plug into ABMS initially will be existing systems, but we are going to have to move a lot of how we do business into the classified domain. I know a lot of members of the committee have taken us up on classified briefings. We appreciate that. We know it is hard that we can't discuss it here, but if we are going to take on a peer like China, we are going to have to have some tricks up our sleeves, and how we do ABMS needs to be where some of our best tricks are.

Mr. BACON. [Inaudible.] —state of the warfighter or do you think we are there? Are we going to be able to meet it?

General HOLMES. Thank you, Congressman Bacon. I would start with I think we already face gaps in our systems that we possess now ability to gather the information we would need in a fight with Russia or China. They are still useful to us in what we call the preparation of the battlefield stage of finding information of indications and warning, but if it comes to a fight, we already have a gap in things like those older RQ–4s, the RC–135, the E–8. They are useful to us in peacetime, but we can't use them during that conflict. So we are trying to address that gap as we go forward.

I think we already have more data than we can sort through to analyze and get to warfighters. And I believe that the work that our AQ [Assistant Secretary of the Air Force for Acquisition, Technology and Logistics] is doing, along with General Hyten and the rest of our service partners, is going to deliver that information as we need.

Mr. BACON. Mr. Chairman, I have some follow-on questions, but I hope I can get a second round. Thank you.

Mr. NORCROSS. Thank you.

Mr. Vela.

Mr. VELA. Dr. Jette, the Army currently plans to upgrade over 750 UH–60s to the Victor model. Most of that work, if not all, is being done at Corpus Christi Army Depot. Can you provide the committee an update on this modernization program? Give us some insight and your thoughts on how things are going at Corpus Christi Army Depot and what you think the benefits of this entire approach are?

Secretary JETTE. Sir, in summary, I would say that things are going well. In 2018, we had 6 Victors converted; 2019 is 18 converted; 25 in 2020; and we are planning to do 24 in 2021. We will continue moving through the rest of the fleet out until about 2034. The conversion process is going well. Corpus Christi is doing a fine job with the conversion process.

Mr. VELA. Do you see anything about Corpus Christi Army Depot to suggest the process is being impeded?

Secretary JETTE. At this point, we are not competing the process. We are incorporating some commercial vendors into the process, and we are actually looking to see whether or not there is some added advantage to recompeting some of the subcomponents.

Depots are very strong, very capable. They have a great deal of resources. It is good sometimes to see if we can inject some of the commercial perspective into the depot environment and facilitate a little bit more aggressive view of things.

Mr. VELA. Thank you.

Secretary Roper, I was recently at Creech and saw the important work you all do with the Reapers. In the fiscal year 2021 budget, the Air Force cut its MQ–9 production to zero. Why the major change in plans, and how will the Air Force address its ISR gap?

Secretary ROPER. Thank you, sir. I will speak to my side of it and then turn it over to General Nahom for the requirements side.

The Reaper has been a great platform for us. I mean, 4 million flight hours, just undeniable overmatch in a low-end, uncontested fight and has certainly saved many lives. But as we look to the high-end fight, we just can't take them into the battlefield. You know, they are easily shot down.

And so what we are preparing to do on the acquisition side as we take down the production line is build the next generation of systems. A lot of industry have come into the drone business, right? It is a big market right now, many commercial applications. And so we will look at a mixture of options for the future. There are things that are more high-end military unique, things that are meant to be able to survive even in a contested environment. Obviously, a lot of technology will have to go in, and they will be likely expensive systems.

But we also see a lot of opportunity to bring in commercial technology, push the price point down, have systems that can be more attritable, we can take more loss with because we can field the quantities needed. And so we are doing studies right now looking at both ends, and I expect that is going to be one of our major decisions in the fiscal year 2022 budget for the Air Force.

General NAHOM. And, sir, yes, what Dr. Roper said is how we are balancing that measured risk with our ISR portfolio on the low end. As you noticed, in the budget, we are taking down the 10 lines this year. And we are working very closely with the intel community and the combatant commands for a measured reduction in the coming years that matches some of the future initiatives that we have in the ISR force, especially in the low-end fight, because we do have to balance the risk with what we are doing current day with where we need to go in the future.

Mr. VELA. So, General Rudder, how will the Air Force's cuts impact the Marine Corps development of a variant, of a Reaper variant?

General RUDDER. Well, I have to first thank General Holmes because we have been able to enter into this world through his network and his training, and we have just had our first two Reaper-certified Marine captains show up in Yuma with four sensor operators because of the Air Force training.

So what we will do is I think, within our MUX system [Marine Air-Ground Task Force Unmanned Aerial System Expeditionary], we are going to have a family of systems, and one of those will be a land-based, long-endurance type of capability. The next generation MQ–9 could be part of that, or there could be something else out there. As Dr. Roper said, this unmanned systems enterprise, if you will, with industry is kind of wide open. There are a lot of opportunities out there.

But I think the Air Force will continue to operate. We hope to be able to continue to operate with the Air Force as we have been looking at our next-generation unmanned system. But I think what we have learned from the Air Force has been invaluable. So we are ready to step out on our own system.

Secretary ROPER. Sir, one quick followup. Although right now we are talking about divesting systems, taking risk in the near term so we can modernize, one of the things we are very focused on for the next budget is not having to simply divest of current missions, but finding a way to do them cheaper.

So a lot of commercial technology can help us in the low-end fight, and we need to do a better job of leveraging it. This will be one of our first challenges, to find a very different price point for continuing to operate and provide invaluable ISR to the warfighter.

Mr. VELA. Thank you for your perspectives.

Mr. NORCROSS. So, 2 years ago, it was all about fifth gen. A year ago, we were reeducated to say we want fourth gen, and that mixture that go hand in glove. And when we look at the F–15EX, that has changed from 18 originally; now we are down to 12. It was explained to us back then that there was a certain mix going into a high-end fight that we would want to have.

So, on one hand, we are increasing the buy for the F–35, and on this hand, we are decreasing the F–15. That mixture ratio was something that was told to us was very important, yet here we are this year looking at a different configuration.

For my friends from the Air Force, can you explain how that has changed?

General NAHOM. And, sir, I will start off that, then I will turn it over to General Holmes for more of the specifics on the fighter. I want to get through some of the programmatics.

As we balanced the President's budget this year, we definitely had to take some—we definitely had to make some tough choices in the endgame. We were very cognizant not to touch the F–35 investment. We wanted to make sure we kept that steady across the FYDP. On the F–15EX——

Mr. NORCROSS. At the requested level or the unfunded level when you say that?

General NAHOM. I would say right now at the requested level, but we know—at our requested level we kept that. We kept that steady across the FYDP. We wanted to make sure we had no reduction in our ability to bring on fifth generation into the Air Force.

The F–15EX is very important because we have added capacity that it brings. It allows us to retire the F–15Cs in the timeline we think we need to retire them, by 2026. We did reduce from 18 down to 12 in this President's budget, but we are going keep the total number in the initial buy of the F–15EX steady across the FYDP, and our intention is to replace the F–15Cs on time as well.

As we were balancing the budget at the very end, the choices, the problem is, as we modernize as an Air Force, and there are some things we are doing day in and day out right now with the combatant commands, and there is certain friction as we modernize that we have to make sure that we are still attending to the current day fight.

And that is where a lot of the balancing was at the end, to make sure we weren't retiring things too quickly, some of the older technologies, while we brought on the new technologies. And it offered some challenges as we close the books on the 2021 PB [President's budget].

Mr. NORCROSS. General Holmes.

General HOLMES. Mr. Chairman, General Nahom and his team worked with the Secretary and the chief to balance the Air Force's submission and to balance a whole lot of activities and all the things that you expect the Air Force to do.

From the Air Combat Command perspective, you know, we continue to believe that we need 72 fighter aircraft a year to keep up with the age of our airplanes and to keep them relevant. What you will hear me say over and over is that I am grateful for the additional money that we have been able to use to get ready over the last 2 or 3 years.

Starting with that 2018 budget, we have had increased funding, which has helped us make all our fighter force ready. And we are grateful for the additional aircraft that the committee provided last year on top of our request. But what I don't want to do is go backwards. I don't want to go back to have aircraft and crews that aren't fully ready for the fight.

And so, as we balance, I don't want to buy more airplanes at the expense of the weapons and the things they need to be effective or the training environment that they need to train in that represents a Chinese or a Russian threat. I will always be arguing within the process that whatever force I have, it needs to be ready so that the

aircrew members we send into harm's way are ready to do their job on behalf of the joint force. And so that is part of the tradeoff that we make when we put the budget together. Thank you.

Mr. NORCROSS. But the configuration, and maybe Dr. Roper, from the 15 assisting the 35s, there was a mix that you brought to us, a ratio. But here we are increasing the 35, and you are reducing the 15.

So it is not a budget consideration. It is a choice that you are making because the dollar for dollar, the fact, if anything, the F–35 sustainment rate, as General Goldfein talked about, is way too high. So talk to that.

General HOLMES. I would take a hack at that. You know, when we made the decision several years ago in 2008 or 2009 to cancel the F–22, we based that on accelerating the F–35 program. And if we had executed that program, the Air Force would have a thousand F–35s right now, which would put us at about a 50–50 ratio of fourth- and fifth-gen fighters.

We just delivered the 500th F–35 to all customers worldwide, not to the Air Force. And so we are behind on reaching that ratio. Right now, we have 3 F–35 squadrons that are operational in the Air Force and 5 F–22 squadrons, 10 out of 55 or so. So we are at about a 20 percent fifth-to-fourth ratio. The study that OSD CAPE did and the different works have said something like a 50–50 ratio. We think maybe 60–40. So we think we are buying toward that ratio that we need in the 2,000 or so fighters that we have, and we have to keep buying F–35s to get to that ratio.

Mr. NORCROSS. So, just to follow up, Pratt and Whitney has a protest in on the engine for the F–15. Can you bring us up to speed with that?

Secretary ROPER. Yes, sir. So there is a protest by Pratt and Whitney on the engine. So like we do with any protest, we will work with the GAO [Government Accountability Office] to resolve the——

Mr. NORCROSS. But are you preparing? If the protest is upheld, it is going to drive that timeline.

Secretary ROPER. Yes, sir. So just, you know, for context, there is—so when the Saudis and Qataris started modernizing the F–15, they have put over $5 billion into modernization, which we want to leverage, especially given how much it costs us to operate the F–15Cs and Ds. So it is just a good business deal to retire the Cs and Ds, trade up to the EX.

Well, part of those modernizations was integrating a new engine by GE on, so the F110. The F100 is on the current F–15E. And so our acquisition strategy was to be able to buy off of the line that the Qataris and the Saudis have stood up. If we have to do an engine competition, it will add time, 2 to 3 years.

And so we will work with the GAO. We will obviously follow their recommendations. But until we have had time to sit down with them, I won't have more that I can say.

Mr. NORCROSS. Right. Just quickly, and this is for all our witnesses. Coronavirus. We see what it is doing to the Italians right now. Turkey, although not the virus problem, threw some additional weight on us. What contingency plans, because I can imagine

after being down in Texas through the F–35 plant that, if it hits there, it is going to have a severe effect on that production.

If you could just briefly from each of the services, how are you planning for this?

General HOLMES. Well, sir, I will go. I attended a meeting today with our chief of staff and Secretary after a meeting yesterday with the Secretary of Defense and the chairman to talk about an overall OSD approach to it.

And we have done the things you would expect us to do. We have gone through the checklists that we have for a potential pandemic, not that we are to pandemic status, but we have planned ahead to look at how it affects us. Right now, we are concerned with the movement of our people back and forth to overseas assignments and the temporary duty that we go back and forth to do exercises, we are working through that policy.

In our industry base, those are certainly challenges that are a larger challenge, I think an American challenge, a national challenge beyond our scope to be able to handle. But we are working to try to safeguard our military members and the communities where they live, and then also safeguard the readiness that we fought hard to gain through this process by thinking ahead and trying to prepare for the next steps.

Secretary GEURTS. Yes, sir. I think for Navy and Marine Corps, the same, all the services working together there. And then we are watching supply chains. Where do we have parts either being repaired or produced overseas. Do we understand supply chains. And for those foreign military sales programs where we have folks going overseas, watching that closely and controlling the movements and taking very measured response, sir.

Mr. NORCROSS. Thank you. Are you in the same boat, no pun intended, for you Army guys?

Secretary JETTE. Close to the same boat, sir, although we are really trying to not do much cruise ship work together. It seems that is not a good thing for coronavirus. We surveyed all the PMs [project managers] and through the POs [program offices], to try and determine which programs are at risk in which areas.

We have both some risk in the supply chain issues that we have got to take a look at, but we have also got to take a look at the delivery of systems because I have got to move people there, deliver the systems, train people. And for the Army in particular, it is a people relationship issue. So we do have an extensive effort right now, trying to make sure we have a good handle on that. The Army senior leaders are working very closely on trying to make sure that we have got all the things we can in place for our military, military families, particularly overseas.

And we do have two benefits that we kind of think we contribute to the Nation. One of them is Joint Chemical, Biological, Radiological, Nuclear Program Office, where we are working with the different health agencies within the government on transferring capabilities that we have and trying to look at biodefense and our bio labs up at in NATICK—or not in NATICK, in Maryland, to see how we can bring some of the technologies that we know there to bear on these problems. We think, within a month, we will have a field-

able local test you can quickly do and determine if someone has the effect.

Mr. NORCROSS. Thank you.

And I apologize, Mrs. Hartzler, for running over.

Mrs. HARTZLER. That is all right, very important questions for sure.

Dr. Jette, to continue with you, the Army has requested to procure 36 UH–60M helicopters for fiscal year 2021, and that is significantly less than 73 requested for in fiscal year 2020. And I understand that, out of the 36, 13 are for the Active Duty, 23 are for the Army National Guard. So why is the number requested significantly lower than the number last year, and how will this impact units that are in the pipeline to receive UH–60M helicopters?

Secretary JETTE. Yes, ma'am. So what we did was, in our procurement last year, our specific effort is to try and retire the alpha models. So we want to get the alpha models out of the National Guard first, and we want to do that by 2022, and then we want to get the alpha models out of the Active forces by 2024. So, to do that, we plussed up on our buy last year, and we are working to buy out more this year.

So you are right. We put 66 of the buys last year for the M models into the National Guard, and we were planning to put 23 out of the fiscal year 2021 buys into the National Guard. This is all leading to our scheme of getting the alpha models out.

Mrs. HARTZLER. So how is this going to impact those that are in the pipeline to receive UH–60M helicopters?

Secretary JETTE. I am——

Mrs. HARTZLER. Is it going to slow down their ability to be able to receive the Mike models, as you have cut the number that you are going to procure this year of the updated versions?

Secretary JETTE. Well, I don't think that—our view of it is that we are not trying to slow down. Sort of, we were lower. For example, we were 62, 58, popped up to 74, and we are back down to 36. And what we just have is affordability of trying to keep the Mike model procurements over a period of time that is affordable. So our intent is not to stop or slow down. It is to get to a level.

Mrs. HARTZLER. So, if a unit was expected and told you were going to get a Mike model, say, within 2 years, then they can expect they will get it?

Secretary JETTE. Yes, ma'am.

Mrs. HARTZLER. That is good. Okay.

General Rudder and Admiral Harris, the Marine Corps has identified and established a requirement for a modernized aviation body armor vest for all HMLA [Marine Light Attack Helicopter Squadron] airframes within the Marine Corps.

In fiscal year 2020, the Marine Corps requested $2.2 million to purchase 1,000 commercial off-the-shelf units that are immediately available. However, the funds provided would not even cover half of the aviation body armor vests needed to outfit all the airframes, and there is no money requested for fiscal year 2021. What is the Marine Corps plan to outfit the rest of the airframes with modernized aviation body armor vests?

General RUDDER. I think this was the initial buy from a request, urgent UNS [universal need statement] request for these additional

body armors, and we put that in there. We think we may have to buy some more, but we will see with the deliveries, see if they like them when we put them with our forward element. So, if you look at the training commands and some of the squadrons that are back, they don't necessarily need, you know, outfit for every single airframe. But those that go forward, we will have enough to outfit those that are actually going into harm's way with these new vests and still have some in the rear to be able to train with.

Mrs. HARTZLER. Okay. We will watch that.

Dr. Roper, during last week's Air Force posture hearing, General Goldfein highlighted the benefits and savings of the T–7 program's digital design and manufacturing techniques as a game-changer for bringing down sustainment and modernization costs in the long term. And I know this is your baby, your initiative that is so exciting.

So are there lessons learned from the T–7 program that the Air Force can apply to drive down costs of other platforms as you go forward?

Secretary ROPER. Yes, ma'am. I mean, the technologies that let you design and build things differently are the most exciting to me. And you know I have worked with you in the past on warfighting technologies. I still love those. But we are going to have to speed up how we build things and be able to work with a broader industry base, or we can be right this year and next year in our budgets and still lose to China simply because we are not working with the entire innovation base that this country has.

Digital engineering has been used in many industries that are commercial. The automotive industry has been fundamentally transformed because of it. And T–7, we have seen the first crossover in the military systems.

I think the lesson to be learned is that when you have that level of design and your design and assembly are digitally rendered—think of it as like a simulator for designing and assembling that allows you to de-risk things before you do them in the real world. It is actually the next evolution past flying before you buy because you can kind of digitally design and fly before you decide to do it in the physical world.

So, ma'am, what it should do is it should transform how we do every acquisition. We should get rid of paper. We should transition to full digital tools. And in the Air Force, for every new program, they have to do this. So for Ground-Based Strategic Deterrent, they have to use these digital tools. And I think what we will learn is that we can de-risk things digitally that we used to have to do in the physical world after we built the system.

Mrs. HARTZLER. I know my time is up, but I certainly hope 100 percent of the services are adopting the same technology.

Secretary GEURTS. Yes, ma'am. And in shipbuilding, nuclear shipbuilding, all of our submarines and aircraft carriers are 100 percent digital design from the start, which also goes all the way through sustainment.

Mrs. HARTZLER. That is great. Thank you very much.

I yield back.

Mr. NORCROSS. Mr. Bacon.

Mr. BACON. Thank you, Mr. Chair. I have a couple questions on electronic warfare. So my first is for Dr. Jette and Mr. Geurts. I applaud the efforts made on your rotor-wing aircraft and all the emphasis you put on infrared kind of countermeasures. We are seeing an increased capability that the opposition or our enemy, potential adversaries would have with radar-guided missiles for helicopters even at those lowest of altitudes.

Do we have the appropriate priority for countermeasures for RF [radio frequency] being put on our new helicopters or current ones we use?

Secretary JETTE. Sir, our current helicopters have—we have got two new programs that we are working with on the helicopters. One of them is LIMWS, Limited Interim Missile Warning System, that gives us an ability to detect these missiles coming in faster and then use various methods, chaff and flares to decoy them away. We have some other things that we——

Mr. BACON. Is there a jamming pod associated?

Secretary JETTE. We need to talk in a different forum.

Mr. BACON. Fair enough. Mr. Geurts.

Secretary GEURTS. Again, across the board, between all of our, you know, F–18Gs and all of our next generation pods——

Mr. BACON. You could go with the rotor wing.

Secretary GEURTS. But even on the rotor wing, we are switching over kind of our decoys and techniques there, taking advantage, again, of the rip-off and deploy R&D. So if the Air Force or the Army has done something, we will work on getting it into our fleet as quickly as possible.

Mr. BACON. Typically, for helicopters, we worry about IR [infrared] threats. Now the RF, increasingly, that envelope is going into the rotor wing.

Secretary GEURTS. Yes, sir.

Mr. BACON. Even at 100 feet, right? So it is important we have a thought or plan for it.

For the Air Force side, I wanted to ask—or maybe it would be better for the record and come back and talk one-on-one. I am concerned about the EC–37 program. We have 5 aircraft out of 10 purchased to replace the EC–130s. A sixth one is in this budget. But now the Gulfstream production line is going to stop. We are talking about buying used ones that we don't know how many hours they will have, what kind of configurations they have been in. And in the meantime, our squadron is going to have partial EC–130s, partial EC–37s. It is very hard for crew management. I am worried about where we are going with this. Can we not buy new aircraft, put them on hold and then modify them later in later budgets?

Secretary ROPER. So I will speak to the acquisition, certainly open it to my colleagues for the operational impacts. But yes, we are working many options to try to accelerate how quickly we can deliver the capability.

We are in discussions, you know, with vendors, and so those aren't things that I can share publicly. But yes, we understand that having a line shut down means we need to think creatively about how we can bring aircraft to bear.

And, sir, I will take as an action to come by and chat with you about what we are thinking.

Mr. BACON. Anything else? I just welcome the office time if we need to do that.

I think, from a squadron commander, which I was a two-time squadron commander, having a squadron with half 130s, half EC–137s, it is pretty hard to manage that crew, especially—you can do it for a short time, but if we are going to do one aircraft a year, I just think it is a risk to that squadron and our capability if we need to deploy them.

Secretary ROPER. Yes, sir. We are aware that putting that burden on the operational community is not a bill that we want to pass. And so, between options to try to extend the line, used aircraft, and alternative aircraft, we are pursuing options for all three. And I can let you know which ones appear to be trending, but I will need to do that in a closed setting, sir.

Mr. BACON. Thank you.

One followup with you, Dr. Roper, if I may. Going to our ICBM [intercontinental ballistic missile] wings, as you know, we are starting to deliver the MH–139A Gray Wolf helicopters. And they have to have the capability to go to an ICBM site in case there is a force protection issue, so you have a door gunner. Typically all right in the summer, but in the winter up there, as you know, it is like minus 30. And what I am hearing is it is so cold that they can't operate the guns.

Do we have a plan, whether it is the right gear, you know, with warmers and the gloves or the mittens? It seems to me we have to have a capability for these door gunners to be effective at what they are doing. Do you have any updates or any thoughts on how we can help out that community?

Secretary ROPER. Yes, sir. We are working closely with Global Strike Command currently. We are aware of the weather conditions in Minot. I went up a year ago right before winter started, and I was there on one of the warmest days on record. So I did not get to experience the full Minot experience. Part of doing UH–1 replacement, the Gray Wolf, is having capabilities that operators can use and to let them do their missions more flexibly.

So cold weather, a primary challenge that has to be overcome. The defenders always tell me to make sure that I say publicly when I am testifying before you that they are some of the toughest airmen in the Air Force, and I think I agree with them.

So we are working a variety of options, environmental options, clothing options, to try to mitigate that risk, sir. And that is part of why we are excited to start getting those aircraft and start doing testing.

Mr. BACON. I will just close by saying I have my ear to the ground with that community, and I know they would be pleased to hear what the plan is because, at minus 30, it is hard to operate a machine gun with an open door. Thank you.

Mr. NORCROSS. Thank you. We have roughly 10 minutes, we expect. So you are good?

So let me, the future strike fighter, the F/A–X. So, if we go back a few years and we look at what happened when we thought we were going to up-ramp the F–35s, we let the F–18s slide down. That was a risk we imagined that didn't come to fruition, and we had to stand up the F–18 to a different number. Yet, here we are

getting ready to curtail 36 Super Hornets because we are expecting, you know, the F/A–XX to come online. Now, we always look to history to kind of teach us in the future. What do you see differently here that historically trying to get that next generation in the original timeframe hasn't been the greatest history that gets delayed? So if you could talk to that.

Admiral HARRIS. Absolutely. So, in PB–21, we did look at the mix of fourth- and fifth-gen aircraft and then started funding the next-gen air dominance family of systems. The F/A–XX is the manned aircraft portion of that.

We believe in the way we have the program designed—it is classified. We are happy to come over and talk to you at the classified level about it. But at the UNCLASS [unclassified] level here, we are working closely with the Air Force to ensure that the systems that we put on that have the TRL [technology readiness level] that gives us confidence that we can achieve that aircraft on time in the early thirties to replace the F–18E/F as it reaches the end of its service life.

Mr. NORCROSS. What is it that we are not seeing this time? Because you made the same—not you. We made that determination years ago, and so it cost you a lot more to stand up a line that was dwindling. Dr. Roper.

Secretary ROPER. Yes, Chairman. I appreciate you and Ranking Member Hartzler taking that classified briefing on next-generation air dominance.

So we are pushing ahead on the Air Force component of the program. If you are asking why do we have hopes that things can be different, it is exactly what Mrs. Hartzler referenced. It is digital engineering tools coming fully into a program, allowing us to be more agile.

So I view it as a must do. It is just as important to get the way we build the future systems right as it is to build those systems.

Mr. NORCROSS. That is the question I wanted. Thank you.

Mrs. Hartzler.

Mrs. HARTZLER. Sure. My last topic here—and thank you for being so patient and covering a lot of important areas. So this is about the Future Vertical Lift. Let me start with you, General Rugen. Last year, Congress provided you with an additional $75 million to help accelerate the Future Long-Range Assault Aircraft program.

Could you update us on how you are using these additional funds to accelerate the program?

General RUGEN. Yes, ma'am. Really, we are leveraging fully the Joint Multi-Role Tech Demonstrator [JMRTD]. We have two demonstrators flying now. And we are taking that demonstrator program into a phase where we are looking at the weapon system. So that is a higher bar, and, honestly, it is driving down the risk of those, you know, making it more of a weapon system.

It also set the conditions for a 4-year acceleration on the program from 2034 first unit equip to 2030. And then it is also informing our trades analysis on our requirements, so getting requirements that are achievable.

Secretary JETTE. If I can just add.

Mrs. HARTZLER. Sure.

Secretary JETTE. So this is one of the things that sometimes isn't understood. So I will just make sure it is clear. When we did the JMRTD, you get an aircraft that has the fundamental capability to fly to demonstrate some of the major components of the system. But this issue of it not being a weapon system, for example, it doesn't have—these were never designed to be able to withstand rough landings. They weren't designed to have the data busses that we need for combat operations in them.

All of these things have to be built out for the aircraft. You can either wait until you get through a very formal development program, or you can begin funding some of those efforts. It is the application of those funds to those type of efforts which are actually allowing us to accelerate, because now what we know is we are going to begin transitioning this from simply a demonstrator to a weapon system. And we are pursuing it on both platforms.

Mrs. HARTZLER. Makes sense.

General Rudder, how is the Marine Corps participating in the Future Vertical Lift initiative, and have you requested funding in fiscal year 2021 budget request for this effort?

General RUDDER. Yes. You know, our FVL replacement CAPSET [capability set] 3, we are tied in with the Army. We have actually an officer down in Huntsville participating with all their meetings. So the Army is going a lot faster than we are. Our replacement for the H–1 doesn't really come into play until about 2035, but we are tracking everything that the Army is doing and watching that.

We are also using the limited funds that we put in there. I think you added some funds for us last year. We put about $10 million in for 2021, just to look at operating concepts, mission survivability, and really digital operability. Much like we are doing with our unmanned systems, we want to make sure that we have got, within the industry model we have got the digital and operability right. But we are tied in with the Army in tracking this very closely as they down-select to their next two air vehicles.

Mrs. HARTZLER. Good. It looks like you want to say something, and I was going to go back to you anyway just on the last question regarding affordability of this platform. There have been two studies over the last year analyzing the Future Vertical Lift affordability. So can you walk us through the results of the studies, explain to us what measures the Army is taking to ensure affordability for both the Future Vertical Lift as well as the Future Attack Reconnaissance Aircraft?

General RUGEN. Yes, ma'am. Those two studies, one from the Congressional Budget Office and then one from CSIS [Center for Strategic and International Studies], really analyzed our past 20 years of historical procurement dollars. And what came out was, with two aircraft going forward, we trended towards, from 2019 to 2050, on the procurement of our new aircraft, the lower end of those budgets. So a lean program, a lower end of those budgets and not a higher end.

So we also were cautioned by those two reports to maintain, you know, vigilance over our operations and sustainment costs, and we are doing that now. So we have five pillars of cost in our cost-conscious culture requirements. We are picking it and sticking it. We

are not going to have the requirements creep you have maybe seen from past aviation programs.

We also have competition. There is robust competition from industry to win these aircraft. IP and data rights strategy, we are part of a pathfinder program with Dr. Jette on what is going to be our IP and data rights strategy. We have also gone to school with external experts on past programs that maybe had cost overruns. And then the O&S [operation and sustainment] cost and technology that, you know, I echo Dr. Roper. We are in the digital design environment, and that is going to impact in a positive way our ops and sustainment cost.

Mrs. HARTZLER. That is encouraging. Hopefully, you can be an example for other application programs. Thank you.

Mr. NORCROSS. First of all, I want to thank you all of you for coming, all eight of you, and certainly our staff for prepping us for all eight.

Just a quick reminder. Our ISR is April 1st. Mr. Bacon I know particularly, so we can do the ABMS and some more questions along that line.

With that, we are adjourned.

[Whereupon, at 3:34 p.m., the subcommittee was adjourned.]

A P P E N D I X

MARCH 10, 2020

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 10, 2020

Statement of the Honorable Donald Norcross
Chairman, Subcommittee on Tactical Air and Land Forces
Fiscal Year 2021 Tactical and Rotary Wing Aviation Programs
Budget Request

March 10, 2020

The hearing will come to order.

Today, the subcommittee meets to review Army, Navy, Air Force, and Marine Corps tactical and rotary wing aviation programs in the fiscal year 2021 budget request.

We have an extensive portfolio of aviation programs to cover today, including Navy and Air Force tactical fighter aircraft and how we are addressing shortfalls in our fighter fleets, Army aviation modernization and the Future Vertical Lift family of programs, the Marine Corps' next generation heavy-lift helicopter, the CH-53K, and what all four services are doing to reduce safety-related incidents and upgrade aircraft survivability systems across military aviation.

As a reminder, the subcommittee is planning to hold a separate hearing later this month to specifically discuss the F-35 Joint Strike Fighter program, but aspects of that program may come up at higher-levels in our discussion today.

I would like to welcome our distinguished panel of witnesses:

Dr. Bruce Jette, Assistant Secretary of the Army for Acquisition, Logistics, and Technology;

Brigadier General Walter Rugen, Director, Future Vertical Lift Cross Functional Team;

Mr. James Geurts, Assistant Secretary of the Navy for Research, Development, and Acquisition;

Lieutenant General Steven Rudder, Deputy Commandant of the Marine Corps for Aviation;

Rear Admiral Gregory Harris, Director, Air Warfare for the Chief of Naval Operations;

Dr. Will Roper, Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics;

General "Mike" Holmes, Commander, Air Combat Command for the Air Force; and

Lieutenant General David Nahom, Deputy Chief of Staff for Plans and Programs at Headquarters Air Force in the Pentagon.

Secretary Jette and Secretary Geurts are back again for the second week in a row – thank you, gentlemen, for your time.

And thank you to all our witnesses for your service and for agreeing to appear before us.

Aviation research, development, and acquisition for Army, Navy, Air Force, and Marines remain budget priorities, emphasizing the enduring relevance of combat aviation in steady-state operations and in potential future conflicts.

However, the fiscal year 2021 request underlines the tough choices ahead of us, and highlights that even within the context of the largest defense budget in history, resources need to be allocated wisely and to the highest priorities.

The budget request before us trades current capacity for future capability, calculating that the need to invest in high-end, next generation systems will have to come at the expense of existing aircraft flying current, steady-state and contingency missions.

Regarding the Department of the Navy tactical aircraft force structure, we want to understand more about the operational risk the Navy is proposing with this year's budget request.

The Navy's budget proposal removes 36 Super Hornet strike-fighter aircraft planned after fiscal year 2021 and shuts down the F/A-18 production line beginning in 2023.

The Navy informed the subcommittee that this budget decision increases its strike-fighter shortfall from 49 to 58 aircraft in fiscal year 2021.

In addition to that shortfall, we understand the Navy only plans for 44 strike fighter aircraft per carrier air wing, giving the Navy a combat-coded aircraft requirement of 396 strike-fighters.

However, the Navy does not include Attrition Reserve aircraft in its carrier air wing design for strike-fighters, which would normally be included as risk mitigation for aircraft losses during training or and wartime contingency operations.

We need to understand what risk the Navy accepts by planning for no Attrition Reserve aircraft in its carrier air wings.

This leads me to my next observation about the Navy's strike-fighter inventory management and planning decisions.

As I mentioned earlier, the Navy's budget proposes termination of the F/A-18 Super Hornet production line after 2021 and plans to forego buying 36 new Super Hornets in favor of fielding its new FA-XX fighter aircraft in 2030.

I will remind everyone that we saw similar Navy and Marine Corps optimism that did not achieve previous predictions during F-35 development years ago.

We need to understand what gives Navy leadership confidence that FA-XX will be different and that terminating Super Hornet production is prudent 10 years before FA-XX is just planned to be operationally fielded.

The future of naval aviation is further complicated by Acting Secretary of the Navy Modly's announcement establishing a "Blue Ribbon Future Carrier 2030

(FC-2030) Task Force"- a six month study designed to look at the future of the aircraft carrier and carrier-based aviation - manned and unmanned - for 2030 and beyond.

We look forward to understanding the motivation behind establishing this study and when we might expect to review the findings and recommendations.

Turning to the Army, spending on the Army-led Future Vertical Lift initiative will approach a billion dollars in fiscal year 2021, with the bulk of the requested funding accelerating the two new development aircraft – the Future Attack Reconnaissance Aircraft, "FARA", and the Future Long Range Assault Aircraft, "FLRAA."

FARA - the replacement for the now-retired Kiowa Warrior scout helicopter - is long-overdue and will down-select to two competitive offerings later this month.

Further, the request and the Future Years Defense Plan speed up acquisition for the Blackhawk helicopter replacement, "FLRAA", injecting additional funding to pull procurement forward by four years.

This schedule has both "FARA" and "FLRAA" reaching First Unit Equipped at the same time, in fiscal year 2030.

Our Army witnesses should be prepared to explain what measures they are taking to ensure these two programs stay on cost and schedule.

Last year's NDAA included a provision directing Army leadership to provide Congress with the comprehensive strategy for Army aviation modernization.

We expect that this report will be delivered on time, by the end of this month, and that it will clarify how the Army's aviation roadmap will meet enduring and future multi-domain operations missions.

Some of my committee colleagues and I have commented during hearings that we are concerned about the Administration's disregard for the separation of powers between the branches of government.

Article One, Section Nine of the Constitution confers the power of appropriation upon the Congress.

While we are not the Appropriations Committee, in many instances - especially on matters of national security - this committee works hand in glove with our Appropriations counterparts.

Both the fiscal year 2020 National Defense Authorization Act and the fiscal year 2020 Defense Appropriations Act included $28 million in advance procurement for long-lead items for the CH-47F Block II Chinook - the Army's only modernized heavy-lift helicopter.

Now we have learned that, despite congressional direction to the contrary, the Army has put these funds on hold pending a decision from Army leadership.

Congress was clear in our direction in last year's legislation.

I am interested to hear more details about the Army's plans to preserve the heavy-lift industrial base.

Management of the CH-53K heavy-lift helicopter program remains another area of interest for this committee.

As Secretary Geurts and General Rudder are aware, we devoted substantial time and effort last year to increase congressional oversight and examine how the program intended to resolve technical discrepancies that were still being discovered as the program moved into Low Rate Initial Production.

Efforts from both the Marine Corps and the CH-53K contractor to instill more rigorous program management are paying off, however, much work remains to close out subsystem test events prior to Initial Operational Test and Evaluation next year.

We want to know that program costs are under control and that Congress will not be asked for another large funding shift from procurement back to research and development. Marine Corps vertical assault and other key heavy-lift missions require an updated, reliable helicopter to take the place of the CH-53 Echo.

As I said at the outset, we have a lot of programs to cover, and we look forward to this discussion.

As the committee continues deliberations on the fiscal year 2021 National Defense Authorization Act, we will take a close look at these and other issues to ensure taxpayer dollars are spent wisely on our top aviation priorities.

Now, I turn to my friend and ranking member of the Tactical Air and Land Forces subcommittee, Mrs. Hartzler for any opening remarks she would like to make.

RECORD VERSION

STATEMENT BY

THE HONORABLE BRUCE D. JETTE, PhD
ASSISTANT SECRETARY OF THE ARMY
FOR ACQUISITION, LOGISTICS AND TECHNOLOGY
AND ARMY ACQUISITION EXECUTIVE

AND

BRIGADIER GENERAL WALTER T. RUGEN
DIRECTOR, FUTURE VERTICAL LIFT CROSS-FUNCTIONAL TEAM

BEFORE THE

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

ON

DEPARTMENT OF DEFENSE TACTICAL AND ROTARY AIRCRAFT ACQUISITION AND MODERNIZATION PROGRAMS IN THE FISCAL YEAR 2021 PRESIDENT'S BUDGET REQUEST

SECOND SESSION, 116TH CONGRESS

MARCH 10, 2020

NOT FOR PUBLICATION UNTIL RELEASED BY THE
COMMITTEE ON ARMED SERVICES

Introduction

Chairman Norcross, Ranking Member Hartzler, and distinguished Members of the Subcommittee on Tactical Air and Land Forces, thank you for this opportunity to discuss the Fiscal Year 2021 (FY21) President's Budget request for Army Tactical and Rotary Aircraft Acquisition and Modernization Programs. On behalf of the Secretary of the Army, the Honorable Ryan McCarthy, and the Chief of Staff of the Army, General James McConville, we thank you for the invitation to join you today and look forward to a productive discussion.

Aviation is one of the Army's largest portfolios in terms of budget, and an important element of the Joint, inter-organizational, and multi-national team. Aviation provides significant capabilities to maintain superiority over our adversaries by increasing lethality and survivability of the force, providing enhanced mobility into and within the theater of operations, and enabling unprecedented situational awareness and battlespace integration.

In FY21, the Army continues to align the aviation portfolio to the 2018 Army Strategy's lines of effort for Readiness and Modernization to achieve the Army of 2028; the 2018 National Defense Strategy's Approach to Build a More Lethal Force; and the 2018 National Security Strategy's Pillar III, "Preserve Peace through Strength." In order to maintain standoff and overmatch against near-peer competitors, we must continue to develop new capabilities. The Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT) and Army Futures Command (AFC), including Program Executive Office Aviation and the Future Vertical Lift (FVL) Cross-Functional Team (CFT), are working together to rapidly develop capability to support Multi-Domain Operations (MDO).

Aviation modernization priorities are aligned under four Signature Modernization Efforts (SMEs), formerly referred to as Lines of Effort, to provide capability for the Army of 2028: the Future Long-Range Assault Aircraft (FLRAA); the Future Attack Reconnaissance Aircraft (FARA); the Future Unmanned Aircraft System (FUAS),

comprising Future Tactical UAS, Air Launched Effects (ALE) and Scalable Control Interface (SCI); and Modular Open System Approach (MOSA). While doing so, we must balance our investments in future capabilities with the readiness and modernization of our current Black Hawk, Apache, and Chinook fleets. In accordance with the FY20 National Defense Authorization Act, the Army is currently preparing an Army Aviation Strategic Plan and Modernization Roadmap that will include an analysis of the platforms and capabilities necessary to support current and future missions.

Our focus on modernization comprises two parallel lanes of execution – modernization through new platforms and targeted modernization efforts for the current fleet. Characteristics that originate from the FVL CFT are key efforts that have priority in both funding and staffing. Aviation modernization efforts will provide the necessary standoff and overmatch against near-peer competitors through the tenets of Reach (speed, range, and endurance), Lethality, Survivability, and Affordability. Concurrently, the Army continues to refine the highest priority requirements for MDO that drive incremental modernization updates into the current fleet, which are synchronized and coordinated throughout the Army Aviation Enterprise.

Resourcing Army Modernization

Major investments in new airframes and technology are necessary to achieve standoff and overmatch against near-peer competitors. However, fiscal and technological realities require incremental modernization of the current fleet, which will result in varied fleet configuration and capability. As such, the current fleet's role in MDO may be limited in scale. The Army's forthcoming congressionally-required report, Army Aviation Strategic Plan and Modernization Roadmap, will address the approach to these challenges.

In FY21, the President's Budget request totals $36.9 billion for the Army's Research, Development, and Acquisition (RDA) program, which includes $24.1 billion for Procurement and $12.8 billion for Research, Development, Test and Evaluation (RDT&E). Aviation RDA includes $3.536 billion for Procurement and $1.317 billion for

RDT&E. These resources are balanced between investment for FVL modernization capabilities, ongoing production, and targeted modernization of the current fleet.

FY21 Aviation Key Investments

Army aviation investments include required capability in the reconnaissance, attack, assault, unmanned systems, utility, cargo, fixed wing, and aviation enabler systems mission profiles. Specific investments in this portfolio include the following:

FARA. FARA is the Army's number one aviation modernization priority and is integral to effectively penetrate and dis-integrate adversaries' Integrated Air Defense Systems. FARA will fill the capability gap for light weight attack/reconnaissance. FARA provides significant advancements in aviation technology over the capability once provided by the OH-58 Kiowa. It will enable Combatant Commanders with greater tactical, operational, and strategic capabilities through significantly increased speed, range, endurance, survivability, and lethality. The current FARA Competitive Prototyping (FARA CP) effort will down-select from five to two vendors in late March 2020. The two selected vendors will develop flying prototypes culminating in government flight test evaluation no later than FY23.

FLRAA. FLRAA will provide power projection from relative sanctuary with significantly increased range, speed, mobility, and payload over current Army and U.S. Special Operations Command (SOCOM) aircraft. The Army seeks to continue the industry momentum from the successful Joint Multi Role Technology Demonstrator (JMR-TD) efforts. In FY21, we plan to complete requirements derivation, trade-off analysis, and preliminary conceptual design work to help inform the Army on the requirements, acquisition strategy, and program processes of the FLRAA PoR. The program will continue efforts to refine affordability and MOSA, develop the Contract Requirements Package, and initiate the Source Selection Evaluation Board to support an FY22 PoR contract award.

FUAS. FUAS funding supports the characterization of the FTUAS platform, which is intended to be a runway independent unmanned aircraft that provides the Brigade Combat Teams with expeditionary, intelligence, surveillance, and reconnaissance with improved target location and designation. The FY21 requests supports early development of FTUAS that would enable anticipated initial fielding of this Brigade Combat Team Shadow replacement by FY25.

Apache. The Army will continue to explore ways to achieve cost avoidance and efficiencies for the AH-64 Apache, while completing the AH-64E Apache Remanufacture Program. This program is designed to renew the current Apache fleet by incorporating current technologies and a new airframe to extend the aircraft's useful life and make it the most technologically advanced weapon systems on the battlefield.

Black Hawk. The UH-60 Black Hawk continues to be the Army's workhorse and modernization efforts focus on the continued procurement of the UH-60M aircraft, complete qualification of the H-60V, recapitalization (RECAP) of UH-60L aircraft into the UH-60V aircraft with a digital cockpit, and continued divestment of legacy aircraft. The divesture of H-60As from the Army National Guard is scheduled to be complete by the end of FY22 and from the Active Component by the end of FY24.

Lakota. The UH-72A Lakota continues to be fielded to the Combat Training Centers and Fort Rucker, Alabama, to conduct training operations. All expected buys will be completed in FY21.

ITEP. The Improved Turbine Engine Program (ITEP) is key to improving Black Hawk and Apache range, payload, and loiter time over the current 701D engine. ITEP increases the capability to operate in high hot (6k/95 degrees) environments. FY21 funding continues Engineering and Manufacturing Development (EMD) including engine component testing, First Engine To Test, begins Preliminary Flight Rating testing, covers Apache platform/engine A-Kit Critical Design Review, and begins physical airframe integration.

Chinook. The Army will complete fielding of the CH-47F Block I in FY21. The CH-47F fleet is one of the Army's youngest and most modern fleets. The Army is committed to the CH-47F Block II EMD program and is investing in the ongoing MH-47G Block II production for our Special Operations Aviation Forces. The Army remains committed to working with our allies and partners to pursue Foreign Military Sales opportunities to maintain the health of the Chinook industrial base. The Army expects to make a decision on its heavy lift platforms for the future in 2023.

Aviation Mission System and Architecture. The Aviation Mission System and Architecture Project Office within PEO Aviation is advancing open system architecture to support rapid introduction/updates of capabilities, enhance aircrew safety, increase battlefield lethality, improve aircraft survivability, and provide cross-platform portability. This provides Army aviation a scalable digital backbone with distributive processing and aligns to MOSA standards, allowing Air-to-Air and Air-to-Ground convergence and the rapid integration of evolving technologies.

Survivability. Aircraft survivability is critical to Army modernization and readiness efforts to equip the force and maintain future dominance. The Aircraft Survivability Portfolio provides advanced sensor detect capabilities with the Limited Interim Missile Warning System (LIMWS) and advanced laser defeat capabilities with the Common Infrared Countermeasure (CIRCM) system. Designed for rotary wing, tilt-rotor, and small fixed-wing platforms, these capabilities ensure Army aviation is able to dominate a complex and continuously changing environment to pace the threat. The Army is also continuing the development of capabilities that allow the exploitation of a Degraded Visual Environment (DVE). The Army's DVE directed requirement effort delivers a DVE system that provides a forward looking, fused-sensor image giving aircrews situational awareness in single aircraft, takeoff, and landing in brownout conditions.

Fixed Wing. FY21 budget funds fixed wing fleet modernization through development, prototype, and demonstration efforts shaping the Army's future Aerial

Intelligence, Surveillance and Reconnaissance (A-ISR) strategy while ensuring fleet readiness is maintained. The FY20 Airborne Reconnaissance Low-Enhanced (ARL-E) Follow-on Operational Test and Evaluation enables fielding the new multi-sensor platform in FY21. Prototyping a new Enhanced Medium Altitude Reconnaissance and Surveillance System with Electronic Intelligence (EMARSS-E) capability and developing a high-altitude A-ISR demonstration platforms for tactical concept validation will aid in refining the Army's fixed wing modernization requirements and priorities.

Reform. Army aviation is instrumental in implementing the Army's new intellectual property (IP) policy (Army Directive 2018-26, "Enabling Modernization through Management of Intellectual Property"). The Army's IP Policy stresses identifying and planning for IP needs early in the lifecycle of any system. It includes IP requirements, strategy, licensing considerations, and open communication with industry. PEO Aviation is also participating in the Program Management Resource Tools (PMRT) pilot program. PMRT is designed to capture and manage program data across the enterprise to enable real-time analysis and data-driven decisions. This effort will help to ensure senior Army leadership has the information necessary to make informed decisions across Army programs, while providing a modern management tool for programs.

Conclusion

It is clear that the security challenges of tomorrow will be met with the Tactical and Rotary Aircraft Acquisition and Modernization Programs we develop, improve, and procure today. Because our adversaries will continue to invest in technology to counter or evade U.S. strengths and exploit vulnerabilities, resource reductions and insufficient Army Rotorcraft Modernization will place at risk the Army's ability to overmatch its opponents.

We can assure you that the Army's senior leaders are working hard to address current challenges, as well as the needs of Army aviation in the future. We are doing so

with affordability as our watchword, meeting the equipping needs of our Soldiers while we endeavor to remain good stewards of our Nation's resources.

Mr. Chairman and distinguished Members of this Subcommittee, thank you for your steadfast and strong support of the outstanding men and women in uniform, our Army Civilians, and their Families.

The Honorable Dr. Bruce D. Jette
Assistant Secretary of the Army (Acquisition, Logistics and Technology) and
Army Acquisition Executive

Dr. Bruce D. Jette was confirmed by the United States Senate as the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) on December 20, 2017, and sworn into office on January 2, 2018. In this position, he serves as the Army Acquisition Executive, the Senior Procurement Executive, the Science Advisor to the Secretary of the Army, and the Army's Senior Research and Development official. He also has principal responsibility for all Department of the Army matters related to logistics.

Dr. Jette leads the execution of the Army's acquisition function and the acquisition management system. His responsibilities include providing oversight for the life cycle management and sustainment of Army weapon systems and equipment from research and development through test and evaluation, acquisition, logistics, fielding, and disposition. He is also responsible for appointing, managing, and evaluating program executive officers and managing the Army Acquisition Corps and Army Acquisition Workforce. In addition, he oversees the Elimination of Chemical Weapons program.

Prior to his confirmation, Dr. Jette served as President and Chief Executive Officer of Synovision Solutions, LLC, an innovative company he founded to provide management and technical consulting, engineering services, and project management in support of military and governmental agencies, as well as commercial industry.

A decorated veteran of 28 years of active duty, Dr. Jette retired as a Colonel following a career that included several armor and cavalry company commands, two overseas tours, various staff assignments at the battalion and brigade level, and over two years of operational deployments to Afghanistan, Iraq and Kuwait. Highlights of his previous acquisition service include founding the U.S. Army Rapid Equipping Force; serving as Program Manager for Soldier Systems which led to the establishment of Program Executive Office Soldier; and being honored as U.S. Army PM of the Year for his success as Product Manager for all Army airborne electronic warfare systems.

Dr. Jette is a graduate of the United States Military Academy with a Bachelor of Science degree in Nuclear Engineering and Chemistry. He also holds both a Master of Science degree and a Doctorate in Electronic Materials from the Massachusetts Institute of Technology. He was an Adjunct Professor at the Edmund A. Walsh School of Foreign Service Security Studies Program at Georgetown University.

His numerous military awards and commendations include the Distinguished Service Medal, Legion of Merit (3), Bronze Star Medal, Meritorious Service Medal (3), Army Commendation Medal, Army Achievement Medal (2), National Defense Medal (2), Operation Iraqi Freedom Campaign Ribbon, Operation Enduring Freedom Ribbon, Army Service Ribbon, Army Overseas Ribbon (2), Parachutist Badge, Army General Staff Award, and Order of Saint Maurice (Legionnaire).

Brigadier General Walter Rugen
Director, Future Vertical Lift Cross Functional Team,
U.S. Army Futures Command

Brig. Gen. Walter (Wally) Rugen is the director of the Future Vertical Lift Cross-Functional Team located at Redstone Arsenal, Alabama.

Rugen was born and raised in Onalaska, Wisconsin, and was commissioned through the United States Military Academy at West Point, New York in 1989. Prior to FVL, he served as the 7th Infantry Division deputy commanding general-support at Joint Base Lewis-McChord, Washington. Rugen's previous assignments include Headquarters, Department of the Army; 2nd Combat Aviation Brigade; and 3rd Battalion, 160th Special Operation Aviation Regiment.

Rugen's team is currently focused on four efforts: Future Attack Reconnaissance Aircraft Capability Set 1, Future Long-Range Assault Aircraft Capability Set 3, Modular Open System Architecture and Future Unmanned Aircraft System.

BG Rugen is married to the former Ms. Leigh Anne Boling and they have three wonderful children, Victoria, Jacoh and Wesley.

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THE HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

STATEMENT OF

THE HONORABLE JAMES F. GEURTS
ASSISTANT SECRETARY OF THE NAVY
RESEARCH, DEVELOPMENT AND ACQUISITION ASN(RD&A)

AND

LIEUTENANT GENERAL STEVEN RUDDER
DEPUTY COMMANDANT FOR AVIATION

AND

REAR ADMIRAL GREGORY HARRIS
DIRECTOR AIR WARFARE

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY AVIATION PROGRAMS

March 10, 2020

NOT FOR PUBLICATION UNTIL RELEASED BY
THE HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Introduction

Chairman Norcross, Ranking Member Hartzler and distinguished members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Department of the Navy's (DoN) Fiscal Year (FY) 2021 budget request. We appreciate your leadership and steadfast support for Navy and Marine Corps aviation acquisition and research programs.

Dominant naval force and a strong maritime strategy are the primary engines of our National Defense Strategy (NDS). As we continue to face rapid change in the global security environment, including greater global trade and greater unpredictability, our national security posture must likewise change to adapt to the emerging security environment with a sense of urgency and innovation. This requires the right balance of readiness, capability and capacity as well as budget stability and predictability. It necessitates us to deliver relevant, effective, capability to our Sailors and Marines, and a constant focus on and partnership with the industrial base. They are key elements to our national security.

The character of war has changed, and so must our approach to developing the world's most lethal military force. We are no longer fighting against the great powers of the 19th and 20th centuries, and conflict is no longer limited to the domains of land, sea and air. The rapid pace of technological innovation means our adversaries have unprecedented access to new tools and technologies. To maintain overmatch means the Navy must maintain warfighting readiness to enable the operational reach, resilience and sustainment that will enable the best Naval forces in the world to operate forward where and when we choose. The Department of the Navy is currently on year three of a transformational journey to increase readiness recovery, improve acquisition outcomes, and deliver greater lethality, which has seen marked improvement in speed and scale of acquisition, maintenance availabilities, and recapitalization efforts. These improvements are enabling the Department to better achieve our objectives of building a more lethal force with greater performance and affordability. We will continue to focus our efforts on four key priorities: deliver and sustain lethal capacity, increase agility, drive affordability, and develop the workforce.

Deliver and Sustain Lethal Capacity

In FY 2019 we delivered 125 new manned aircraft and 15 Unmanned Air Vehicles (UAVs) to Navy and Marine Corps units, improving capability and enabling the divestiture of less affordable and less capable legacy systems. In FY 2020, the Department plans to deliver an additional 125 aircraft and two Group 5 and approximately 300 Group 1 UAVs. The DoN's FY 2021 budgets supports the procurement of 121 manned and unmanned aircraft with 537 across the Future Years Defense Program (FYDP).

Multiple aviation and weapons platforms completed key milestones last year. Long Range Anti-Ship Missile (LRASM) and MQ-4C Triton declared 'Early Operational Capability' in November and December 2019, respectively. MQ-25 completed its first test flight in September 2019 just 13 months after contract award. F-35C achieved Initial Operational Capability (IOC) in February 2019 and is tracking towards its first deployment on a CVN in FY 2021.

Aviation readiness has improved substantially because of process improvement, leveraged from commercial best practices that span aviation depot performance in component repair and heavy maintenance, organizational and intermediate level maintenance performance, supply chain reform, and reliability-centered engineering improvements. The Department achieved our goal of over an 80 percent Mission Capable (MC) F/A-18 E/F and EA-18G Primary Mission Aircraft Inventory by October 1, 2019. Our Marine Tactical Aircraft achieved the 80 percent MC goal episodically through FY 2019 – on seven separate occasions for our F/A-18A-D fleet and one occasion for our F-35 fleet. The Department is committed to maintaining these systemic improvements for the long term and expanding the success across other type/model/series aircraft. The Naval Sustainment System (NSS) is aggressively pursuing these reforms. On-time funding over multiple years will be a key enabler to maintaining these procurement and readiness gains.

Complementing efforts to improve the F/A-18 fleet's readiness, the Department made great strides in extending the service lives of these aging jets. Twenty-five F/A-18A-D aircraft underwent crucial life extension modifications, while 15 F/A-18E/F aircraft are currently in work to receive Service Life Modification (SLM) this fiscal year. The first SLM MC aircraft delivered to the fleet in January 2020. The Department continues to learn and actively manage this critical effort.

To support our focus on sustainment, the Department established a Deputy Assistant Secretary (DASN) for Sustainment to develop, monitor and implement policy and guidance that will enable the Department to better plan, program, budget and execute our sustainment mission. DASN Sustainment will oversee and manage Navy and Marine Corps sustainment and life-cycle management policies, allowing the Department to improve and align the complex drivers of maintenance and modernization completion – that in turn will increase our output to the Fleet. Two aviation programs, the E-2D Hawkeye and H-1, are currently in the Sustainment Program Baseline (SPB) pilot program to align and improve performance, cost, and schedule requirements and governance throughout operations and sustainment. We will review these pilots to assess effectiveness, and plan to expand SPBs across other Navy and Marine Corps programs.

Increase Agility

Delivering the right capabilities at the right time and sustaining our competitive advantage as a naval force requires an integrated, enterprise approach to business process improvement and modernization. The Department is moving beyond transactional ways of doing business and towards a fully integrated enterprise, linking our requirements and acquisition processes and integrating these processes with industry to become more agile, accountable and efficient. We will be better able to compete and win by expanding that integration and continuing those efforts at scale and at speed.

The Department continues to evaluate additional opportunities for middle-tier acquisition programs such as Next Generation Naval Mission Planning System and the use of recently established Office of the Secretary of Defense acquisition pathways for further program agility. Additionally, we have successfully leveraged "Prize Challenges" for our Marine Air/Ground

Task Force, Unmanned Aerial System, Expeditionary (MUX) and the Tactical Resupply Unmanned Air System (TRUAS) to decrease the time to field.

The Department collaborated with Defense Digital Services on a joint effort providing a unique environment and opportunities for service members and civilian acquisition workforce to collaborate with and apply modern approaches and industry best practices to how the Department of Defense (DoD) buys and builds technology.

In addition, we continue to take deliberate actions to challenge bureaucracy. In 2019, the Department cancelled 28 percent of our acquisition-related instructions and streamlined the remaining 72 percent. A thorough review of SECNAV 5000.2F – the primary instruction implementing the defense acquisition system – eliminated duplicative processes and resulted in a 65 percent reduction in page count. By removing the bureaucratic obstacles that slow innovation, we are becoming a more agile organization, better-focused on delivering mission requirements to the Fleet.

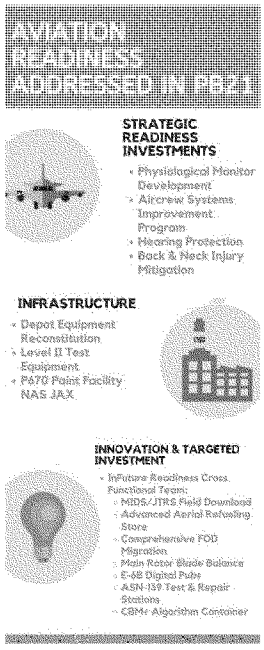
Drive Affordability

Building and sustaining our Navy requires creative and aggressive contracting methods to achieve the right capability. We achieved savings through leveraging and procuring commercially available aircraft spares, process improvements to maximize efficiency and effectiveness, foreign military sales, and Multi-Year Procurements (MYP) for programs such as F/A-18, E-2D, and V-22. For the Navy, the E-2D MYP represents significant cost savings, approximately $410 million, over the lifetime of the contract. For the F/A-18E/F MYP contract, totaling approximately $4 billion, the Navy will save a minimum of $395 million. The Department also saw significant savings of over 12 percent compared to the previous Lot (delivered in 2019) with the award of the Lots 12-14 F-35 Air Vehicle contract.

Build a Workforce to Compete and Win

A key aspect to increased lethality and readiness is the development of the workforce needed to compete and win. The Department has issued a new Acquisition Workforce Strategic Plan establishing the vision for shaping the future acquisition workforce. We provided commercial online training to expand training opportunities, increased experiential learning through industry rotations, and conducted understanding industry courses at public universities

for over 300 members of the acquisition workforce. The Navy is embarking on the development of a Talent Management System to capture and leverage a data-driven solution leveraging commercial best practices for the Acquisition Workforce to develop, retain, and reward people to meet current and future organizational needs. These efforts help ensure we have the right people, with the right skill set to deliver critical capabilities to the Fleet. The Department focused our Acquisition Workforce Funding to attract talent that will infuse the civilian workforce targeting critical skill gaps such as STEM and Information Technology. The Navy also leveraged hiring authorities provided by Section 1111 of the 2017 NDAA to hire high quality acquisition and technology experts with a focus on Supply Chain and Sustainment challenges. This expertise is working with our Prime contractors to ensure that the Navy has the right supply base, managed in the right way to materially improve the resiliency, readiness, affordability and security of the Navy supply base in the short to medium term.



The Fiscal Year 2021 President's Budget Request

The President's FY 2021 budget builds on these initiatives in order to provide the best-balanced force in support of the NDS, enabling us to deliver the people, the platforms, and the capabilities necessary to protect American interests around the world. This budget builds on prior investments while making the adjustments necessary to build and sustain a more lethal, resilient, agile, and ready aviation force. FY 2019 and FY 2020 provided key down payments on lethality, with a priority on improving our overall readiness posture.

The FY 2021 budget funding levels continue to ensure optimal fleet readiness, increasing aircraft depot maintenance and logistics funding 14 percent from FY 2020 enacted levels, allowing us to build upon the readiness gains made this past year for some of our key platforms like F/A-18 and F-35B/C. The budget also increases the Flying Hour program by 5.8 percent, maximizing executable capacity that likewise aligns

the funding for air operations to the mission capable rates to ensure that all squadrons deploy combat-ready. Additionally, Fleet Readiness Center improvements include more modern equipment, processes and workflow improvements, similar to what we're doing in our public shipyards. We are leveraging industrial best practices, including improved organizational and predictive analytics integration through the Naval Sustainment Strategy to further modernize the way we do aviation maintenance and grow our capacity.

The Department is focused on increasing the lethality and capability of our aviation portfolio through leading edge technology development and modernized platforms. The FY 2021 budget continues investment in key Navy and Marine Corps developmental programs such as CH-53K, F-35, Next Generation Jammer, and Maritime Strike Tomahawk (MST). Although the FY 2021 budget decreases from FY 2020 as we complete the buy of several type-model-series, the Department continues maintaining the F-35B/C, E-2D, and V-22 as well as the advanced helicopter training system. The Navy plans to procure the final 24 F/A-18E/F aircraft of the MYP in FY 2021 with a total procurement objective of 678. The Department also continues execution of MYPs for KC-130J, E-2D, MV-22, and CMV-22. The Department likewise provides Research, Development, Test and Evaluation (RDT&E) investments in aviation enhancements and recapitalization efforts, such as accelerating technology improvements for F-35C.

Summary

Naval Aviation operates forward - near our potential adversary's home shores. With an increasingly complex national security environment and overt challenges to the current international order, it is imperative we deliver the ready, capable, and global sea-based and expeditionary force to meet these challenges. Our vision is to provide the right capability in the hands of the warfighter, on schedule, and in the most affordable manner possible.

We appreciate the strong support this Subcommittee has always provided our Sailors and Marines. Together we will ensure our military's capability, capacity and readiness will continue to deliver superior naval power around the world both today and tomorrow.

Programmatic details regarding Navy and Marine Corps capabilities are summarized in the following section.

TACTICAL AVIATION

Strike Fighter Inventory Management

The Department maintains a requirement of 785 strike fighters to meet force generation and force application obligations with nine carrier air wings. The President's FY 2021 budget request continues the Department's momentum in reducing strike fighter inventory risk through the procurement of 10 F-35Bs, 21 F-35C and the completion of F/A-18E/F multi-year contract with 24 FA-18E/F Block III Super Hornets. These efforts along with systemic improvements in Aviation readiness will provide the required combination of lethal capacity, capability and affordability for the carrier air wing now and into the future.

In tandem with these procurements, F/A-18E/F Service Life Modification (SLM) enhances our inventory by maintaining the tactical relevance of the F/A-18 E/F. This will provide the enduring capability and capacity to allow a transition to the Next Generation Air Dominance Family of Systems in the 2030's. The President's FY 2021 request funds 179 SLM inductions across the FYDP. Original Equipment Manufacturer early learning through the currently inducted aircraft will support "productionizing" SLM and Block III upgrades incorporated in SLM, and is critical in meeting throughput and schedule. The first SLM MC aircraft delivered to the fleet in January 2020. The Department is actively managing SLM performance through a Perform to Plan (P2P) approach.

Tactical Aircraft Force Mix

The Carrier Air Wing of the future focuses on coupling the 5th Generation combat capabilities resident aboard the F-35C with the weapons capacity aboard the 4th Generation F/A-18 E/F. Continued investment in the survivability and lethality in our Lightning II, Super Hornets, and future weapons will ensure Department investments directly counter and defeat our adversaries' combat advancements. The F-35C also brings other unique warfighting capabilities to the USMC and the Marine Air-Ground Task Force (MAGTF). Combined with the Tactical Air Integration commitment, the F-35C will integrate and deploy for all USMC global force commitments except Marine Expeditionary Unit deployments, which require vertical landing capability aboard L-Class ships.

The Navy has divested from legacy Hornets at the operational edge, with the Reserve component and Naval Aviation Warfighting Development Center following in 2025. This also

affords the Marine Corps the opportunity to select the remaining "best of breed" legacy Hornets to maximize the overall readiness, capacity, and capability to round out the Department's inventory.

Pilot and Aircrew Shortfalls and Mitigation Strategies

Naval Aviation continues to meet all fleet requirements. Retention and merit-based bonuses and incentive pay are showing some success in retaining Post-Command Commanders, though Aviation Department Head acceptances are still short in some type model series. The Department expects competition for talent with industry will continue, requiring a robust and competitive compensation program to recruit, retain, and distribute the force.

F-35 Joint Strike Fighter

The F-35 Joint Strike Fighter supports and enables the National Defense Strategy while driving cost down, improving quality, and ensuring timely modernization of capabilities. Both the F-35B and F-35C are vital to our future as they become the lethal cornerstone of our naval air forces. During the next 10 years, the Navy and Marine Corps will transition 21 squadrons to the F-35 as we replace our aging legacy fleet.

The Marine Corps has already established one Fleet Replacement Training Squadron, one operational test squadron, and three operational line squadrons. USMC F-35Bs are currently operating in support of two different Marine Expeditionary Units (MEUs) / Amphibious Readiness Groups from amphibious assault ships. In February 2019, the 13th MEU returned to the U.S. after conducting operations in Syria and Afghanistan. The MEU's composite Air Combat Element included six F-35Bs, the first U.S. F-35s to deploy in combat where they successfully performed deep strike and close air support missions. In addition, F-35Bs operating from Iwakuni, Japan have conducted five 31st MEU deployments – operating in Thailand for the first time - and F-35Bs will deploy in the spring in support of Her Majesty's Ship (HMS) QUEEN ELIZABETH in support of the United Kingdom's Carrier Strike Group 21. The Navy now has established one Fleet Replacement Training Squadron, has one operational squadron, and will complete transition of the first USMC F-35C squadron in August of 2020. Additionally, the first TOPGUN class incorporating the F-35C into the 4th / 5th Generation Fighter integration began in January of 2020.

The Department also remains committed to reducing F-35 costs, successfully reducing the recurring flyaway cost of the Marine Corps F-35B to no greater than $101.3 million dollars and the Navy F-35C cost to $94.4 million dollars by Low Rate Initial Production (LRIP) Lot 14. This represents a 12.3 percent and 13.2 percent reduction from LRIP Lot 11, respectively. We are also working to decrease operation and sustainment costs targeting steady state Cost Per Tail Per Year (CPTPY) of $6.8M for the F-35B by 2033, and $7.5M CPTPY for the F-35C by 2036.

The baseline program has delivered more than 490 aircraft to test, operational, and training sites (all variants) and will deliver 141 aircraft and 158 engines (all Services and partners) during calendar year 2020 on its way to a Full Rate Production / Milestone C decision in fall of 2020. The F-35 program continues to mature with base stand-up, sustainment of fielded aircraft and maturation of the global sustainment enterprise.

The FY 2021 President's budget requests $4.5 billion in Aircraft Procurement (APN) funds for 10 F-35B and 21 F-35C aircraft, modifications and spares.

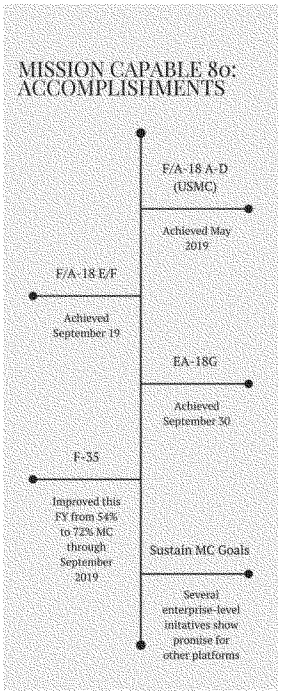
F-35 Continuous Capabilities Development and Delivery (C2D2)

With the F-35 program soon closing Block 3F System Development and Demonstration, we must continue to modernize the aircraft with advanced capabilities to maintain the advantage over advancing adversary fighters and ground-based radar threats. Towards that end, the Department restructured the original Block 4 Follow-on Modernization acquisition strategy into a more agile Continuous Capabilities Development and Delivery (C2D2) model. The C2D2 approach leverages commercial practices, develops capability in smaller, more easily managed increments, and accelerates delivery of warfighting capability. The approach also advances departmental goals of reducing C2D2 risk and lowering cost. To continue the delivery of capability to the warfighter in FY 2021, the DoN requests $794 million in RDT&E.

F/A-18 A/B/C/D Hornet

Service Life Extension Program (SLEP), High flight hour (HFH) and Center Barrel Replacement (CBR+) efforts extend the F/A-18 A-D beyond its original service life of 6,000 hours to 8,000 hours, and in select aircraft, up to 10,000 flight hours. Twenty-five aircraft underwent HFH and or CBR+ and included SLEP modifications in FY 2019 with 29 aircraft

planned for delivery in FY 2020. Along with flight hour extensions, these aircraft require capability upgrades to their radars, electronic warfare suites, and avionics systems to maintain tactical relevance and pace the threat as the Marine Corps plans to fly a portion of the legacy F/A-18 A-D fleet through the FY 2030 timeframe to bridge the transition gap to an F-35B / F--35C fleet. Overall Readiness and Sustainment of the F/A-18A-D platform average MC increased from 58 percent to 73 percent throughout calendar year 2019.



The FY 2021 budget requests $154.3 million in APN to implement aircraft commonality programs, enhance capability, improve reliability, and ensure structural safety of the F/A-18 A-D inventory, and $86.4 million for the continuation of the Hornet SLEP.

F/A-18E/F Super Hornet

The F/A-18E/F Super Hornet will be the numerically predominant aircraft in the carrier air wing (CVW) into the 2030s. Continued investment in new aircraft, capability enhancements and SLM significantly improves CVW lethality. Twenty-four F/A-18 E/F Block III Super Hornets were procured last year, and another 24 are planned for procurement this fiscal year. In tandem with these procurements, SLM initiatives and capability upgrades enhance our inventory by maintaining the tactical relevance of the F/A-18 E/F. In terms of overall Readiness and Sustainment of the F/A-18E/F platform, the average MC rate of Primary Mission Inventory Aircraft increased from 61 percent to 81 percent throughout calendar year 2019.

The FY 2021 President's Budget requests $1.76 billion in APN for procurement of the final 24 F/A-18E/F Block III Super Hornet aircraft and $140.3 million of RDT&E for improvements, radar upgrades and Block III development.

AV-8B Harrier

During FY 2019, the AV-8B Harrier program completed critical Fleet required Validation/Verifications to enhance flight safety, increase readiness and improve supply chain asset management. In addition, the program completed the last Link-16 initial installations in the Radar fleet, finalized Joint Standoff Weapon integration and separation testing, and conducted AIM-9X instrumented carriage flights for airworthiness. These upgrades were critical in 2019 in support of two back-to-back shore-based combat deployments. The platform continues to support combat deployments from MEUs.

The FY 2021 budget requests $20.1 million in RDT&E funds to continue design, development, integration and test of platform improvements. These improvements include continuation of an Engine Life Management Program, Escape System upgrades, Joint Mission Planning System updates, Link-16 Digital Interoperability (DI) integration, mission and communication systems, navigation improvements, weapons carriage updates, countermeasure improvements, and updates to an Obsolescence Replacement/Readiness Management Plan.

The FY 2021 budget also includes $34.1 million in APN to continue the incorporation of Obsolescence Replacement/Readiness Management Plan systems, electrical and structural enhancements, LITENING Pod upgrades, engine safety and operational changes, DI upgrades that include Link-16, and inventory sustainment upgrade efforts to offset obsolescence and attrition.

Next Generation Air Dominance (NGAD) Family of Systems

The Department completed its NGAD Family of Systems Analysis of Alternatives (AoA) in FY 2019 to enable the planned sunset of F/A-18E/F Super-Hornet aircraft during the 2030s. The AoA considered the widest possible range of materiel concepts while balancing capability, affordability, schedule, and supportability, along with manned and unmanned approaches to meet threat-based mission requirements.

In FY 2020, Navy's Next Generation Fighter program (F/A-XX) begins the Concept Refinement Phase. During this phase, iterative collaboration will occur between Government and industry teams leading to the development of vendor concepts that balance advanced air dominance capabilities and long-term affordability.

AIRBORNE ELECTRONIC ATTACK (AEA)

EA-18G Growler

The EA-18G Growler is a critical enabler for the Joint force, bringing fully netted electronic warfare capabilities to the fight and providing essential capabilities in the Electromagnetic Maneuver Warfare environment. The EA-18G program completed delivery in October 2019 bringing the total procurement quantity to 160 aircraft. This fulfills current Navy requirements for Airborne Electronic Attack for nine CVWs and five expeditionary squadrons plus one reserve squadron. The FY 2021 President's Budget requests $124.6 million of RDT&E for additional modernization to ensure the EA-18G maintains its edge in the electromagnetic spectrum by providing robust sensing and engagement capabilities.

Next Generation Jammer (NGJ)

The NGJ is the follow-on to the legacy AN/ALQ-99 to counter electronic warfare capabilities and keep pace with the evolving threat. NGJ will maximize the survivability and lethality of the Navy's 4th and 5th generation aviation platforms and strike weapons and support all Services and joint/coalition air, land, and sea tactical strike missions. NGJ will be implemented via three separate programs: Mid-Band (MB), Low-Band (LB), and High-Band. NGJ MB has entered developmental test, with positive results to date. The program's focus in FY 2020 is on delivery for flight and chamber testing. NGJ LB has received proposals to deliver operational prototypes to the fleet by FY 2025. Contract award is planned for late FY 2020.

The FY 2021 budget request includes $176.6 million in APN for three LRIP NGJ-MB shipset procurement, support equipment and associated support; and $170.0 million in RDT&E to continue execution of the NGJ LB Rapid Prototype/Engineering and Manufacturing Development, as well as aircraft and software integration efforts.

ASSAULT SUPPORT AND LOGISTICS SUPPORT AIRCRAFT

CH-53K Heavy Lift Replacement Program

The CH-53K remains the only fully marinized, heavy-lift rotorcraft capable of supporting current and future warfighting concepts for the naval force. In the past year, CH-53K has

executed a Government/Industry Joint Program Plan, demonstrating significant progress in executing development and flight test activities. Notably, the most significant technical challenge of Exhaust Gas Re-ingestion and associated engine integration issues has been resolved, and demonstrated in flight test in fall 2019. All other technical issues are on plan to support the program and contained within the Joint Program Plan. To date, the CH-53K has flown approximately 1,700 flight test hours toward the completion of flight test and is currently 40 percent complete with development test in support of operational test. During FY 2021, the program will continue to execute developmental test flights including shipboard operations, begin modifying system demonstration test article aircraft into the production configuration to support operational test, and perform initial pilot and crew training for operational test.

The FY 2021 President's Budget requests $406.4 million in RDT&E to continue the CH-53K development and test, and $1.1 billion in APN for procurement of seven LRIP aircraft, including advance procurement and initial spares.

CH/MH-53E

Operational demand for CH-53E, the DoD's only heavy lift assault support aircraft, remains high. Introduction and continued execution of the H-53 Reset Initiative has significantly mitigated challenges to the material condition of CH-53E from increased operations. To date, 31 aircraft have completed reset, which returns fully MC aircraft to the fleet and recovers platform readiness, and accumulated approximately 15,400 flight hours. Reset reduces both the cost per flight hour and maintenance man-hours per flight hour as the H-53 approaches 30 plus years of service. Continued reset and sustainment initiatives are critical to the success of the CH-53E until its replacement, the CH-53K, is delivered to the fleet.

The MH-53E continues to perform its primary mission of airborne Mine Countermeasures, as well as transport of cargo and personnel, until the family of modular systems that comprise the Littoral Combat Ship (LCS) Mine Countermeasures Mission Package replaces it.

To keep the CH-53E and MH-53E viable through their remaining services lives, the FY 2021 budget requests $74.8 million in APN and $6.8 million in RDT&E. This funding provides Condition Based Maintenance software upgrades, Integrated Vehicle Monitoring Unit upgrades, cockpit upgrades, Embedded Global Positioning System / Inertial Navigation System, T-64

engine reliability improvements, survivability upgrades, and Phase II of CH-53E's Degraded Visual Environment Capability Implementation Plan. These safety and avionics upgrades are essential to address obsolescence issues within the cockpit, increase overall situational awareness, and maintain mission effectiveness.

ATTACK AND UTILITY AIRCRAFT

AH-1Z/UH-1Y

The AH-1Z and UH-1Y provide attack and utility support to the MAGTF, deploying globally with Marine Expeditionary Units. Completing procurement in FY 2019, over a decade has passed since the initial fielding of the Venom and Viper. The fleet faces obsolescence issues in software architecture, Aircraft Survivability Equipment (ASE), navigation equipment, Health and Usage Monitoring Systems, and precision-guided weapons. A predominant focus is on readiness improvements that will increase material reliability and material availability, including engineering improvements to drivetrain components and air vehicle components. Previously funded hardware retrofits continue, while concurrent efforts across the Naval Aviation Enterprise are being leveraged to maintain affordability and provide Distributed Aperture Infrared Countermeasures (DAIRCM), LINK-16, Adaptive Networking Wideband Waveform, Full Motion Video, Joint Air-to-Ground Missile, and AIM-9X capabilities.

The FY 2021 President's Budget requests $192.4 million in APN and $62.3 million in RDT&E for aircraft modernization efforts that significantly increase survivability, safety, and lethality on the modern battlefield. Future modifications to maximize standoff and facilitate teamed engagement options are planned to support Distributed Maritime and Expeditionary Advanced Based Operational environments. As all of the Services look toward future vertical lift possibilities, the Marine Corps is participating in the Joint Future Vertical Lift Program and monitoring Army Future Long-Range Assault Aircraft and Future Attack Reconnaissance Aircraft program progress to leverage lessons learned as requirements are defined.

MH-60R/S

The MH-60 R/S are the cornerstone of the Navy's helicopter concept of operations, providing multi-mission support including Anti-Submarine Warfare, Anti-Surface Warfare,

Personnel Recovery, special operations support, and combat logistics among a variety of other missions.

The FY 2021 President's Budget requests $131.6 million in APN and $41.1 million in RDT&E. APN funding supports safety related systems improvements, corrections of deficiencies, warfighter upgrades, and obsolescence issues, including mission-computer modernization and procurement of kits for the Helmet Display Targeting System, Advanced Data Transfer System, Data Link, and Very High Frequency (VHF) Omni-Directional Range / Instrument Landing System (VOR/ILS). RDT&E funding supports developmental efforts including MH-60S Service Life Assessment Program, implementation of Link-16, enabling in-flight target updates to Net Enabled Weapons, continued software development, Diminishing Manufacturing Sources and Material Shortages, engineering and developmental activities including capability and architecture studies keeping the MH-60 operationally relevant.

EXECUTIVE SUPPORT AIRCRAFT

VH-3D/VH-60N Executive Helicopter Series

The VH-3D and VH-60N continue to execute the no fail mission of Executive Helicopter Support. The FY 2021 President's Budget requests $8.2 million of APN to continue programs that ensure the in-service Presidential fleet remains safe, reliable and current. Ongoing efforts include a Communications Suite Upgrade (Wide Band Line of Sight) that provides persistent access to the strategic communications network, and the continuing Structural Enhancement Program necessary to extend platform service life for both VH-60N and VH-3D platforms. The VH-92A program directly leverages applicable technology updates from legacy platforms.

VH-92A Presidential Helicopter Replacement Aircraft

The FY 2021 President's Budget requests $99.3 million in RDT&E and $631.0 million of APN. RDT&E funding continues Engineering, Manufacturing and Development activities, to include, completion of Initial Operational Test and Evaluation and associated test reports, cyber-testing and evaluation, and completion of the Interactive Electronic Technical Manual development and verification. FY 2021 is the third and final year of the production buy, with $610.2 million APN to procure five LRIP Lot 3 aircraft and associated support, completing VH-

92A procurement. Planned retrofit modifications, $20.8 million APN, include incorporation of the Federal Aviation Administration mandated Automatic Dependent Surveillance Broadcast Out system, upgrades to the Mission Communication System servers, and shipboard interoperability.

COUNTER UNMANNED AIRCRAFT SYSTEMS (C-UAS)

The Navy continues implementation of integrated C-UAS solutions designed to protect high value and critical Naval assets afloat and ashore as well as basic defensive measures at priority shore installations against the threats posed by unmanned aircraft systems. Our C-UAS efforts focus on maintaining commonality of current C-UAS solutions while rapidly evaluating, improving and implementing an integrated family of systems to meet evolving threats afloat and ashore. The Department is rapidly pursuing refinement of material solutions, threat-based mission assessments, development of advanced target discrimination and defeat capabilities while continuing installation, integration, improvement and sustainment of C-UAS capabilities at priority sites/installations and afloat platforms. The Marine Corps sees promise in the use of Directed Energy (DE) weapons for C-UAS through the procurement and employment of the Compact LASER Weapons System (CLAWS). We continue to engage with the Army as the designated C-UAS Executive Agent (EA) and provide support in standing up the Joint C-UAS Office. Additionally, in partnership with the C-UAS EA, we plan to refine an open architecture solution for common C2 system, as well as, continue to improve the capability of the C-UAS family of systems.

STRIKE WEAPONS PROGRAMS

Offensive Missile Strategy (OMS)

The Navy's offensive strike systems consist of a broad family of current and future weapons that together can, and will, strike from the sea, air, and land. These weapons capitalize on key system attributes (e.g. speed, range, lethality, survivability, and commonality) with a strong focus on delivering 'multi-domain' capabilities. The OMS supports a wider, more systematic approach towards delivering offensive weapons balance to increase overall force effectiveness to address emerging threats.

Our current OMS construct has three pillars. First, the Department will sustain relevant weapon systems. Our objective is to preserve the readiness and capacity of our key strike weapons inventories. Second, the Department will pursue strike weapon capability enhancements. Under this initiative, the Navy will develop near-term capability upgrades to enhance existing weapons that provide critical improvements to our current long-range strike weapons capabilities (e.g. MST, LRASM V1.1, SM-6/Block 1B, and the Naval Strike Missile). Third, the DoN will develop next generation strike missile capabilities to address emerging threats.

The OMS is reviewed annually based on current capabilities and emerging threats, and updated to leverage analytical processes/study updates. The results are used to inform annual RDT&E and procurement funding priorities to achieve an optimal mix of offensive strike missile system capabilities. The 2020 OMS is currently being finalized and is a classified document. Additional details about next generation weapons development can be provided in a classified setting.

Tomahawk Cruise Missile

Tactical Tomahawk (TACTOM) is the nation's premier, all-weather, long-range, survivable, deep-strike offensive weapon against fixed and mobile targets. To date, over 2000 Tomahawk combat expenditures have provided both first and surgical strikes, effectively countering conventional and asymmetric threats to US/Coalition Forces.

The FY 2021 budget requests $200.3 million in RDT&E, $462.2 million in Weapons Procurement, Navy (WPN) and $84.1 million in OPN in support of Tomahawk modernization. The Tomahawk modernization effort replaces life-limited components such as navigation and communications systems and provides opportunity to introduce maritime strike and improved warhead capabilities, transitioning TACTOM from the Block IV to the Block V configurations.

Next Generation Land Attack Weapon (NGLAW)

NGLAW will provide the next generation of long-range, kinetic strike capability to destroy high-priority fixed, stationary and moving targets – as well as those targets hardened, defended or positioned at ranges such that engagement by aviation assets would incur unacceptable risk. NGLAW will be capable of kinetic land and maritime attack from both

surface and sub-surface platforms. The NGLAW AoA has completed and the classified results have been shared with all four congressional defense committees.

Offensive Anti-Surface Warfare (OASuW) Increment 1 (LRASM)

OASuW Increment 1 (LRASM) provides Combatant Commander's the ability to conduct ASuW operations against near/mid-term high-value surface combatants protected by Integrated Air Defense Systems with long-range Surface-to-Air-Missiles and to deny adversaries sanctuary of maneuver. The program achieved Early Operational Capability on the Air Force B-1B in early FY 2019 and on the Navy's F/A-18E/F aircraft in early FY 2020. The FY 2021 President's Budget requests $35.8 million in RDT&E for LRASM V1.1 development and testing and $168.9 million in WPN to purchase LRASM All-Up-Round weapons.

Offensive Anti-Surface Warfare (OASuW) Increment 2

OASuW Increment 2 is required to deliver the long-term, air-launched ASuW capabilities to counter 2028 threats (and beyond). The Department continues to plan for OASuW Increment 2 via full and open competition. To inform the long-term path forward, the DoN will leverage the NGLAW AoA results to inform the required ASuW capabilities. The AoA study to determine the Increment 2 path-forward will complete in 3rd Qtr FY 2020. In the interim, the Navy is pursuing incremental upgrades to LRASM to bridge the gap to OASuW Increment 2 program of record. Increment 2 IOC is planned for the FY 2028-2030 timeframe.

Sidewinder Air-Intercept Missile (AIM-9X)

The FY 2021 budget requests $5.9 million in RDT&E and $126.5 million in WPN for AIM-9X. RDT&E will be applied toward the Engineering Manufacturing Development of critical hardware redesign driven by obsolescence; completion of test and fleet release of System Improvement Program missile software (Version 9.4); and design and development of Insensitive Munitions improvements. WPN funding is requested to procure a combined 270 All-Up-Rounds and Captive Air Training Missiles and associated missile/trainer related hardware.

Advanced Medium-Range Air-to-Air Missile (AMRAAM/AIM-120D)

The FY 2021 budget requests $44.3 million in RDT&E and $327 million in WPN. The RDT&E will be applied toward continued software capability enhancements to counter emerging threats; completion of test and fleet release of System Improvement Program missile. WPN funding is requested for 315 All-Up-Rounds, 10 Captive Air Missiles, and associated missile-related hardware.

Small Diameter Bomb II (SDB II)

The FY 2021 budget requests $62.5 million in RDT&E for continued development/test of the SDB II weapon, F-35 developmental testing and integration, and F/A-18E/F expanded carriage load out. The Department also requests $78.9 million in WPN to procure 357 All-Up-Round weapons.

Advanced Anti-Radiation Guided Missile (AARGM) & AARGM Extended-Range (AARGM-ER)

AARGM production will begin to ramp down in FY 2021 in support of the transition to AARGM-ER. AARGM-ER provides the Department with an extended range asset to project power and provide Suppression of Enemy Air Defenses, both at-sea and on land. The FY 2021 RDT&E budget requests $6.3 million for Anti-Radiation Missile Foreign Material Assessment; $11.2 million for AARGM Advanced Development, Follow-On Test and Evaluation Correction of Deficiencies, and System Capability Upgrades; and $128.6 million for AARGM-ER development. The Department also requests $86.1 million in WPN for production of 87 baseline AARGM Block 1 modification kits for integration into All-Up-Rounds, and $61.5 million in WPN for production of 24 AARGM-ER All-Up-Round weapons and six Captive Air Training Missiles.

Harpoon II+

The FY 2021 budget request does not include procurement funds for additional Harpoon HII+. However, the Navy will continue to receive Harpoon II+ missiles via a Sales Exchange Agreement. Additionally, in FY 2021 the Navy is continuing maintenance efforts to restore the Encapsulated Harpoon capability to the sub surface fleet.

Joint Air-to-Ground Missile (JAGM)

The FY 2021 budget requests $12.7 million in RDT&E for software development, AH-1Z platform integration, modeling and simulation, and completion of Developmental Testing, and Integration Testing in support of fleet release SCS-8.2.3. The budget request also includes $49.4 million in WPN to procure 203 tactical missiles and four Captive Air Training Missiles.

Advanced Precision Kill Weapon System II (APKWS II)

APKWS II provides high-stowed precision capability combined with low-yield warheads to reduce the risk of collateral damage while achieving the desired effect on the target. The FY 2021 budget requests $24.9 million in Procurement of Ammunition, Navy and Marine Corps (PANMC) for procurement of 1,086 APKWS II guidance section kits (850 Base and 236 OCO) for use on both rotary-wing and fixed-wing platforms.

Direct Attack Weapons and General Purpose Bombs

Fully funding the General Purpose Bombs, Joint Direct Attack Munition (JDAM) line items are critical to building and maintaining the DoN's direct attack weapons inventory. The FY 2021 budget requests $49.6 million for General Purpose Bombs, $80.2 million to procure 3,538 JDAM kits, and $51.4 million for more affordable practice bombs to enhance readiness and prepare for future contingencies.

Addendum A

SAFETY
(Part 1 of 2)

Minimizing the risk of Physiological Episodes (PE) continues to be Naval Aviation's top safety priority and will remain so until all causal factors are understood and mitigated. The Navy has identified multiple interrelated causal factors as contributing to PE, and the current mitigation efforts, including aircraft modifications, aircrew training, and improved maintenance practices, are positively affecting the PE rate for all Type/Model/Series aircraft, and most notably in T-45s and F/A-18s. With these mitigations, Naval Aviation is currently meeting operational requirements and personnel are working in an operationally safe environment.

The T-45 aircraft has witnessed a substantial reduction in its overall PE rate. The PE rate prior to concentrated PE mitigation efforts in June 2017 was 45.3 events per 100,000 flight hours and the mitigation rate as of January 2020 is 8.7 events per 100,000 flight hours, an eighty-one percent reduction. The T-45 Root Cause Corrective Action (RCCA) team completed its review of PEs, and the RCCA team, along with medical doctors and a toxicologist ruled out contaminants as a causal factor in T-45 PEs. The root cause analysis found no single cause of PE but a stacking of factors deriving from the aircraft, aviator equipment, aviator health and training. As a result of the RCCA, T-45 is mitigating low engine bleed air pressure to the Oxygen Concentrator, integrating an Automatic Backup Oxygen System (ABOS) and integrating a new Oxygen Concentrator to improve oxygen generating system performance overall. In FY 2019, an ABOS Critical Design Review (CDR) and a Preliminary Design Review of the new Oxygen Concentrator was completed. Modification of the T-45 Environment Control System (ECS) continues in 2020.

In the F/A-18 aircraft, the Navy implemented changes that are improving the ECS, increasing system reliability and improving the cockpit environment for our aviators. In Legacy aircraft (F/A-18 A-D), the Department has seen an over eighty percent reduction in PE rates, largely due to implementation of Air Frame Bulletin (AFB) 821, which placed life-limits on seven ECS high-time components. Super Hornet and Growler have seen PE rate drop over fifty percent since the peak in 2017. This is largely due to the fielding of the Hornet health Assessment and Readiness Tool, which can identify ECS components prior to failure, preventing a possible PE. The RCCA team identified premature component failure as a contributory factor

in almost 300 PEs. All of those components are under re-design and began the Fleet implementation in 2Q of FY 2020. We continue to collaborate across the DoD to leverage research efforts to help characterize the cockpit environment to ensure we reach long-range, holistic solutions. The RCCA has completed their investigations confirming the high quality of the On Board Oxygen Generating System (OBOGS) oxygen and ruling out contamination as a contributor to PEs. Efforts have begun to redesign the Life Support Systems to update OBOGS input specifications and fielding of multiple ECS components to improve cockpit pressure stability and reliability. We continue to work with industry partners to develop a new OBOGS concentrator for the F/A-18 and EA-18 aircraft. This effort will provide digital data logging of performance, increased reliability and oxygen scheduling in alignment with military standards.

The Department will continue to provide Flag-level leadership and oversight to this critical effort across Naval Aviation. Our engineers, industry partners, physiologists and outside support will continue to work diligently to drive PE to the lowest possible level.

SAFETY
(Part 2 of 2)

Class A, B, and C Aviation-Related Safety Issues Summary

A summary of all Naval Aviation Class A, B and C aviation-related safety issues, including recent mishaps, trends, and analysis from October 2017 through January 2020 follows. The rates presented in the table are based on total mishaps per 100,000 flight hours and include Flight, Flight-Related and Ground mishaps.

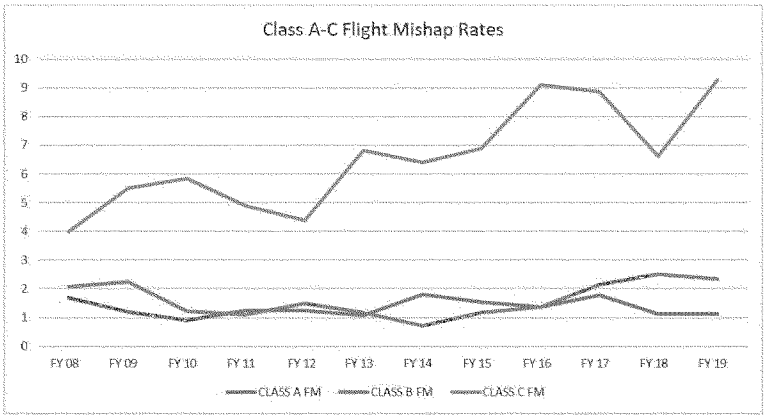
Year	Flight Hours	Class A	Class A Rate	Class B	Class B Rate	Class C	Class C Rate
FY18	1,072,229	17	1.59	38	3.54	222	20.70
FY19	1,066,739	16	1.50	39	3.66	194	18.19

The most recent (FY 2019-31 Jan 2020) DoN flight Class A mishaps include:

- 27 Jan 2020: (OCEANA NAS) F/A-18F received FOD damage to both engines during day in-flight refueling training flight.
- 25 Jan 2020: (Philippine, Sea) MH-60S went down in open ocean during daytime flight off ship. All crewmembers were rescued.
- 16 Dec 2019:(W-72 Range) F/A-18F Basket slap during inflight refueling caused FOD damage on both engines of receiving aircraft.
- 02 Oct 2019: (NAS Pax River, MD) E-6B struck bird and sustained engine damage during touch and go landing. Aircraft landed safely, no injuries.
- 09 Aug 2019: (Arabian Sea) E-2D During a bolter, an E-2D struck four aircraft on flight deck. Diverted safely. No injuries.
- 31 Jul 2019:(Near Death Valley National Park Rainbow Canyon) F/A-18E: Aircraft impacted canyon wall during low altitude training. Pilot died in crash. 7 Civilians Injured.
- 06 Jun 2019: (Imperial, CA) CH-53E experienced a fire upon takeoff. Aircraft safely landed at civilian airport. No significant injuries noted.
- 20 May 2019: (Cherry Point, NC) AV-8B During Functional Check Flight, in landing pattern AV-8B Harrier pilot ejected resulting in complete aircraft loss. No fatalities.
- 10 May 2019: (NAS Kingsville, TX) T-45 engine failure on short final. Both aircrew ejected successfully.
- 06 May 2019: (Iwakuni, JPN) F-35B aircraft aborted take-off due to bird strike. There were no injuries or damage to civilian or DOD infrastructure.
- 03 May 2019: (Mountain Home AFB, ID) F/A-18D - While conducting PMCF, aircraft had an engine bay fire. Aircraft recovered to airfield. Aircrew uninjured.
- 30 Mar 2019: (Yuma, AZ) AH-1Z Viper struck ground during a nighttime training mission. Two aircrew fatalities..
- 28 Feb 2019: (MCAS Miramar, CA) Two F/A-18C's collided in mid-air while conducting CAS. Both aircraft landed safely. No injuries.
- 05 Dec 2018: (Philippine Sea) F/A-18D and KC-130J collided while performing fixed wing aerial refueling mission. F/A-18 aircrew ejected with one fatality. 5 aircrew fatalities in the KC-130.
- 12 Nov 2018: (Philippine Sea) F/A-18F aircraft malfunction resulting in loss of aircraft; aircrew recovered and in stable condition.
- 18 Oct 2018: (Pacific Ocean) MH-60R crashed on takeoff onboard CVN.

DoN Class A aviation ground and Flight Related mishaps (AGM and FRM):

- 06 Aug 2019: (SOCAL Op Area) MH-60R Airborne Low Frequency Sonar Assembly departed the aircraft into the ocean. (FRM)
- 07 Feb 2019: (Tinker AFB, OK) E-6B being towed out of a hangar when vertical stabilizer struck the hangar. (AGM)
- 09 Dec 2018: (MCAS New River, NC) CH-53E landing gear inadvertently retracted during ground taxi. (AGM)
- 09 Oct 2018: (Kadena AFB, Japan) Two HH-60H helicopters taxied into each other on the taxi ramp. No injuries. (AGM)



DoN Historical Mishap Rate Trend per 100K Flight Hours per Mishap Class

James F. Geurts
Assistant Secretary of the Navy
(Research, Development and Acquisition)
12/5/2017 - Present

On Dec. 5, 2017, Mr. James F. Geurts was sworn in as Assistant Secretary of the Navy for Research, Development & Acquisition (ASN (RD&A)), following his confirmation by the Senate November 2017. As the Navy's acquisition executive, Mr. Geurts has oversight of an annual budget in excess of $60 billion and is responsible for equipping and supporting the finest Sailors and Marines in the world with the best platforms, systems and technology as they operate around the globe in defense of the Nation.

Mr. Geurts previously served as the Acquisition Executive, U.S.. Special Operations Command (USSOCOM), at MacDill Air Force Base (AFB), Florida, where he was responsible for all special operations forces acquisition, technology and logistics. In this position his innovative leadership and technological ingenuity provided rapid and affordable acquisition that positively impacted the USSOCOM acquisition work force and the special operations forces capability on the battlefield. These contributions were recognized by both private and public institutions during his tenure to include earning the Presidential Rank Award, USSOCOM Medal, William Perry Award and Federal Times Vanguard Award for Executive of the Year.

Prior to Senior Executive Service, Mr. Geurts began his career as an Air Force officer where he served as an acquisition program manager with engineering and program management leadership positions in numerous weapon systems including intercontinental ballistic missiles, surveillance platforms, tactical fighter aircraft, advaneed avionies systems, stealth cruise missiles, training systems and manned and unmanned special operations aircraft.

He has over 30 years of extensive joint aequisition experienee and served in all levels of acquisition leadership positions including Acquisition Executive, Program Executive Officer and Program Manager of Major Defense Acquisition Programs.

Mr. Geurts is a distinguished 1987 ROTC graduate from Lehigh University where he received a Bachelor of Science in Electrical Engineering. He holds a Master of Science in Electrical Engineering from Air Force Institute of Technology, Wright-Patterson AFB and in National Security Resourcing from Industrial College of the Armed Forces, National Defense University, Washington, D.C. Mr. Geurts also attended executive leadership and international studies programs at Harvard Kennedy School and George Washington Elliot School.

Lieutenant General Steven R. Rudder
Deputy Commandant for Aviation

Lieutenant General Steven R. Rudder assumed his current position as the Deputy Commandant for Aviation, Headquarters Marine Corps in July 2017.

LtGen Rudder is a native of Canton, CT, and was commissioned as a Second Lieutenant in June 1984. LtGen Rudder previously served as the Director of Strategic Planning and Policy (J5), U.S. Pacific Command.

LtGen Rudder's previous assignments include: Serving in Co B, 3rd Amphibious Assault Battalion; Student, NAS Pensacola, FL, designated a Naval Aviator; HMT- 303, AH-1J helicopter training; HMLA-367, Maintenance Quality Assurance Officer and Weapons and Tactics Instructor; unit deployments to Futenma, Okinawa, and Operations DESERT SHIELD/STORM; HMM-161 (REIN), Weapons and Tactics Officer deploying with the 11th MEU(SOC) back to North Arabian Gulf; AH-1 Division Head, Marine Aviation Weapons and Tactics Squadron One; Operations Officer, HML/A-167; Future Operations Officer, deploying with the 22nd MEU(SOC) to EUCOM and CENTOCM AOR, HMM-261(REIN); Office of Net Assessment, the Office of the Secretary of Defense serving as Mr. Andrew Marshall's Military Assistant; Squadron Commander, HML/A-167 deploying to EUCOM AOR in support of Dynamic Mix; Senior Watch Officer, OIF, 3rd Marine Air Wing Tactical Command Center; J5 Lead planner for Afghanistan and Pakistan, CENTCOM, Tampa, FL; deployed to Afghanistan, Pakistan and Qatar in support of Operation ENDURING FREEDOM; Commander, Marine Air Group 26, deploying to Al Asad, Iraq, in support of Operation IRAQI FREEDOM 9.1; Branch Head of Aviation Expeditionary Enablers (APX), Headquarters Marine Corps Aviation; Legislative Assistant to the Commandant, Headquarters Marine Corps, Office of Legislative Affairs; Commanding General, 1st Marine Air Wing, Okinawa, Japan; deployed Wing to Thailand and South Korea.

LtGen Rudder holds a Bachelor of Science Degree in Business Administration from Boston University, a Masters of Military Studies Degree from the Marine Corps Command and Staff College, and a Masters of Strategic Studies from the United States Army War College.

Personal decorations include the Defense Superior Service Medal, Legion of Merit with Gold Star, Distinguished Flying Cross with Combat 'V', Defense Meritorious Service Medal with Gold Star, Meritorious Service Medal with Gold Start, Air Medal Strike Flight 4, Navy Commendation Medal with Gold Star and Combat 'V', Joint Achievement Medal and Navy Achievement Medal.

Rear Admiral Gregory N. Harris
Director, Air Warfare, Office of the Chief of Naval Operations (OPNAV N98)

Rear Adm. Gregory Harris is a native of Yarmouth, Maine, and a 1987 graduate of the U. S. Naval Academy. He was designated a naval flight officer in May 1989 and subsequently a naval aviator in May 1993.

Prior command tours include Carrier Air Wing 11(CVW-11) embarked on USS Nimitz (CVN 68), the FA-18 E/F series Fleet Replacement Squadron (FRS) Strike Fighter Squadron (VFA) 122 onboard Naval Air Station Lemoore and VFA-115, embarked on USS Ronald Reagan (CVN 76) and as a flag officer, commander of Carrier Strike Group 11(CSG-11).

Harris' sea tours include Attack Squadron 185 (VA-185) aboard USS Midway (CV 41), VFA-22 with deployments aboard the USS Abraham Lincoln (CVN 72) and USS Kitty Hawk (CV 63), and as department head with VFA-115 aboard Abraham Lincoln.

Ashore, Harris' tours include VFA-125 as an instructor pilot and training officer; U.S. Special Operations Command, where he served in the Center for Special Operations, Training, Doctrine and Education Division; Commander Strike Force Training Pacific to serve as the air operations and plans officer; a brief assignment as a battle director, Combined Air and Space Operating Center, in support of Operations Enduring Freedom and Iraqi Freedom; Office of the Chief of Naval Operations (OPNAV) N3/N5 as the deputy director Air-Sea Battle and at OPNAV N98 as the Carrier Strike Aircraft & Programs branch head (OPNAV N980S); commander, Naval Aviation Warfighting Development Center, and Chief of Naval Air Training.

Harris became Director, Air Warfare (N98) in August 2019.

He has accumulated over 4,300 flight hours, 1,045 arrested landings and has flown over 100 combat missions in direct support of Operations Desert Shield, Desert Storm, Southern Watch, Enduring Freedom, Iraqi Freedom, and Inherent Resolve.

Harris' personal awards include the Legion of Merit (five awards), Defense Meritorious Service Medal, Meritorious Service Medal (three awards), Air Medal (six Strike/Flight, one with Combat "V"), Navy and Marine Corps Commendation Medal (four awards, one with Combat "V"), Joint Service Achievement Medal, and the Navy and Marine Corps Achievement Medal (two awards), as well as various other campaign and unit awards.

Updated: 19 August 2019

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UNITED STATES HOUSE OF REPRESENTATIVES

PRESENTATION TO THE
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
UNITED STATES HOUSE OF REPRESENTATIVES

HEARING DATE/TIME: 10 March 2020, 2:00 P.M.

SUBJECT: Department of the Air Force Acquisition and Modernization Programs in the Fiscal Year 2021 National Defense Authorization President's Budget Request

STATEMENT OF:

Dr. William B. Roper, Jr.
Assistant Secretary of the Air Force
(Acquisition, Technology & Logistics)

Gen. James M. Holmes, USAF
Commander, Air Combat Command

Lt Gen David S. Nahom, USAF
Deputy Chief of Staff
(Plans and Programs)

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HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
UNITED STATES HOUSE OF REPRESENTATIVES

Introduction and Strategic Environment

Chairman Norcross, Ranking Member Hartzler, and distinguished members of the subcommittee, thank you for having us here today to provide testimony on Department of the Air Force modernization. Additionally, thank you for your leadership and dedication to rebuilding the United States military. Together, we have made clear gains in improving wartime readiness and setting the tone for modernization, but there remains work to be done.

As the nature and sources of conflict throughout the globe have become more diverse and less predictable, our Nation continues to face a complex set of current and future security challenges, including the resurgence of great power competition from China and Russia. It is clear that supremacy in the air and space domains—a given for any U.S. military operation since the end of the Cold War—can no longer be presumed without deliberate action. The National Defense Strategy shifted our prioritization to high-end warfighting reflecting this changing nature of warfare.

Today, the Department of the Air Force has fully embraced Secretary of Defense Esper's goal of irreversible momentum toward National Defense Strategy implementation. The Department of the Air Force must be ready to compete, deter, and win in this rapidly changing and increasingly complex security environment; defend the homeland; provide a safe, secure, and effective nuclear deterrent; and be able to defeat a powerful conventional enemy while we deter opportunistic aggression in another theater; and continue to disrupt violent extremists. These missions require an increased focus on modernization in all domains that must be sustained to prevail against the advanced threats we face.

Current Capacity and Capability

In the Fiscal Year (FY) 2021 President's Budget, the Department of the Air Force conducted an exhaustive review of our portfolios and made hard decisions to align with the National Defense Strategy, which includes the acceptance of calculated short-term risks. Some difficult choices require the divestiture of legacy platforms in exchange for investment in capabilities needed for the future. Our decisions are supported by learning from multiple, complex wargames to assess alternative warfighting approaches against a peer adversary. Our modernization investments—focused on connecting the Joint force, dominating in space, generating combat power, and conducting logistics under attack—reflect the new strategic reality.

Safety Implementation and Statistics on Trends

Physiological events and mitigation strategy implementation

The Department of the Air Force remains committed to solving physiological events. We are collaborating with the Navy to increase knowledge and develop technology to mitigate physiologic episodes. Air Force flight surgeons and aerospace physiologists, working with Air Force and Navy aircrew breathing system scientists and engineers, re-wrote MIL-STD 3050, the design criteria standard for Aircraft Crew Breathing Systems, based on lessons learned and system improvements from recent investigations. Following appropriate Department of the Air Force, Navy, Army, and industry review, the standard will be published to improve requirements for aircrew breathing system design. To increase our ability to test On-Board Oxygen Generating System (OBOGS) units, the Air Force Life Cycle Management Center is building an OBOGS facility that will be operational this October. Additionally, the Air Force Research Laboratory is

developing cockpit sensors to obtain inflight physiological data to provide better diagnostic data from OBOGS in flight.

Safety statistics on mishaps and trends

From FY15 to present, Department of the Air Force tactical aircraft (i.e., A-10, F-15, F-16, F-22 and F-35) Class A and B mishaps have remained fairly consistent both in rate and quantity. The FY19 Class A mishap rate of 3.3 was a slight increase over the FY15 to FY19 five year average of 2.7. The FY19 Class B mishap rate of 3.3 was the same as the five year average. Fifth generation aircraft comprise a greater percentage of Class A and B mishaps due to their higher costs. From FY15 to present, thirty-eight percent of the Class A and B Tactical Aircraft mishaps involved 5th generation aircraft despite comprising less than seventeen percent of the tactical aircraft fleet during that period. In FY19, 5th generation aircraft flew eleven percent of total tactical aircraft flight hours; however, they accounted for over forty-six of the tactical aircraft Class A and B mishaps.

Tactical aircraft ejection seat modernization strategy and implementation

As of the end of FY19, the Department of the Air Force approved the acquisition strategy for 2906 Next Generation Ejection Seats to Collins Aerospace for the F-15, F-16, F-22, A-10, and B-1 aircraft. Program enhancements include: height and weight accommodations for female aircrew members; passive restraints and new parachutes reducing spinal and extremity injury risk; and modularity which will decrease aircraft maintenance downtime. We expect to award the contract in July 2020 and start of F-15 qualifications at the end of 2021. While fielding priority and schedule are subject to funding availability, we are seeking ways to incorporate them in the

F-15EX as soon as possible. Next Generation Ejection Seats will begin fielding in tactical aircraft in FY23.

Tactical Aircraft Force Mix and Capacity Issues and Mitigation Strategies

We remain committed to the dual-role F-35 and its game-changing capabilities, while we continue to modernize and sustain our aging legacy fleet. The Center for Strategic and Budgetary Assessments (CSBA) conducted a study in March 2019 called, "An Air Force for an Era of Great Power Competition," which indicates our current fighter force structure of 55 squadrons is too small and not sufficiently postured for great power competition. To restore readiness of the force we must refresh the fighter fleet with a mix of 4th generation and 5th generation aircraft, as well as selectively modernize our existing aircraft, to ensure the right capacity and capability to fully implement the National Defense Strategy.

The Department of the Air Force needs approximately 2,100 fighters to meet current warfighting demands. The Department of the Air Force fighter fleet is aging and some platforms will run out of service life soon. The F-15C/D fleet, a majority of older F-16s, and some A-10s will reach the end of their service life in the next 10 years. Prior to 2010, we planned for these aircraft to be replaced by a larger F-22 fleet and a more rapid F-35 procurement profile. The Department of the Air Force was unable to meet the projected timeline, thus requiring more new fighters in the near term to avoid tactical aircraft shortages and significant readiness issues caused by structurally deficient or obsolete fleets. In order to arrest the retirement rate and grow to the future requirement, the Department of the Air Force must procure 72 new aircraft each year.

Certain wartime environments in the future require the F-35 and other advanced capabilities. The Department of the Air Force remains fully invested in the F-35 program,

including modernization and capability enhancements through the FYDP. The Air Force will continue to buy 48 F-35s per year to meet the planned procurement total. F-35s alone will not be operationally sufficient, or be delivered quickly enough to meet National Defense Strategy requirements. Therefore, this year's budget balances current 4th generation and 5th generation capabilities and capacity, while developing a critical, iterative family of capabilities to ensure air superiority by leveraging digital engineering, agile software methods, and open systems architectures.

F-35

The F-35A is the centerpiece of the Department of the Air Force's 5th generation multi-domain capability and is a critical force multiplier for legacy forces. It directly supports National Defense Strategy objectives to "build a more lethal force" and "strengthen alliances and attract new partners." We remain fully committed to the F-35 program of record of 1,763 aircraft. Our budget requests $6.7 billion in FY21—and $30 billion across the FYDP—to continue production and integrate new capabilities. We expect to have more than 20 combat-ready F-35 squadrons in our inventory by 2030, and to ensure those squadrons are ready to counter future threats, we must field F-35 Block 4 capabilities as quickly as possible.

Last year, the F-35 Program Office awarded a contract to Lockheed Martin for production Lots 12, 13, and 14. With this contract, Lockheed Martin agreed to a Unit Recurring Flyaway (URF) cost of $80 million per aircraft for a USAF F-35A by Lot 13, one year earlier than planned. This year we will work closely with the F-35 Program Office to transition the F-35 Autonomic Logistics Information System (ALIS) to a new system called the F-35 Operational Data Integrated Network (ODIN). ODIN will be designed with government-managed infrastructure and significant operator input to ensure worldwide F-35 operations can be cost-

effectively sustained. We are also aggressively pursuing our goal of accelerating the establishment of organic repair capability in Department of Defense (DoD) depots.

Ultimately, the Air Force must field a robust fighter force—with the F-35 as the quarterback—that is able to detect and defeat the most advanced threats we face.

F-22

With its combination of stealth, supercruise, and maneuverability, the F-22 remains a critical component of our 5th generation air superiority force. The FY21 budget requests $1.22 billion in FY21—and $6.3 billion across the FYDP—for modernizations needed to keep pace with evolving threats. Our Section 804 Capability Pipeline combines former TackLink16, TACMAN and GPS M-code programs to deliver iteratively-improved "slices" of each capability on a regular cadence. Future modernizations will leverage this same rapid prototyping approach to ensure this platform rapidly and iteratively modernizes.

F-15

The F-15C/D supports both Homeland Defense and Air Superiority missions. Our F-15 budget requests $2.6 billion in FY21—and $13.1 billion through the FYDP—to address structural fatigue issues and upgrade obsolescing systems.

The 234 F-15C/Ds in the Department of the Air Force inventory will reach the end of their designed service life in the next six to eight years, and our analysis shows additional service life extension programs are not cost effective. Our plan for replacing this aging fleet with a modernized successor, the F-15EX, is moving forward thanks to Congressional support of last year's budget. We propose to buy 76 F-15EXs over the next five years, allowing us to benefit from over $2 billion in foreign partner investment in the F-15 production line. The decision to

refresh the 4th generation fighter force helps mitigate capacity and readiness risks but is not a substitute for the 5th generation capabilities of the F-35 or F-22.

The F-15E fleet provides all-weather, long-range global precision attack in all but the most-contested threat environments. Our modernization efforts will ensure the F-15E aircraft remains viable through the 2040s. Modernizing the F-15E with the Eagle Passive Active Warning Survivability System (EPAWSS), which will also be installed on the F-15EX, demonstrates our commitment to building a more lethal Air Force. EPAWSS will provide critical electronic warfare capabilities that will allow the aircraft to hold targets at risk in more challenging threat environments.

F-16

The F-16 is the Department of the Air Force's primary multi-role fighter and Suppression of Enemy Air Defense (SEAD) and Destruction of Enemy Air Defense (DEAD) aircraft. This program is in the midst of the largest modernization in its history to extend its operational capabilities through the 2040s. The program adds $853 million in FY21—and $4.0 billion across the FYDP—for a Service Life Extension Program affecting 300 aircraft, consisting of 12 structural modifications including wings, canopy sill longerons, and lowering of the bulkhead for each.

In addition, there are several capability upgrades including the Active Electronically Scanned Array (AESA) Radar that significantly enhances the aircraft's ability to detect, track, and identify low-observable, low-flying, and slow-flying targets. The AESA radars began fielding in 2019 and will complete in 2027.

Our acquisition team is carrying out the modifications to this fleet using innovative approaches, such as organic DevSecOps software development. The team recently demonstrated

the Department of Defense's first employment of a new software technology, called Kubernetes, that will speed software deployment cycles to keep pace with rapidly evolving threats. The team is also fielding the Auto-Ground Collision Avoidance System that executes automated recovery maneuvers to prevent terrain collisions. The system already has already saved nine lives, so we are excited to continue fielding this capability for our warfighters.

A-10

The A-10 is an effective Close Air Support (CAS) platform uniquely suited for countering violent extremist organizations. Our current budget adds $100 million in FY21—and $571.4 million across the FYDP—to modernize the A-10, including $100 million for ten new wings. The new A-10-Thunderbolt II Advanced-Wing Continuation Kit contract awarded in August 2019 and will procure up to 112 new wings to outfit the remainder of the programmed fleet between 2022 and 2028. This will provide each A-10 aircraft approximately 10,000 additional flight hours to remain lethal in the coming decades.

The Air Force Operational Test and Evaluation Center (AFOTEC) is completing Congressionally-mandated F-35 and A-10 comparative testing. Full Initial Operational Test and Evaluation will be completed this year with the final report released shortly thereafter. We are working with the Director of Operational Test and Evaluation to ensure test needs are being met in a timely manner.

Light Attack Aircraft Research, Development, and Procurement

The Department of the Air Force will continue its Light Attack Experimentation efforts in FY21, with a focus on networking capabilities that could be shared more broadly with Allies and Partners, especially for Countering Violent Extremist Organizations. As the Department of the Air Force continues experimentation with two AT-6 and A-29 aircraft, respectively, we will

transfer $1.3 billion to U.S. Special Operations Command to purchase aircraft for its armed overwatch mission, which is a separate effort.

Next Generation Air Dominance System of Systems

The Department of the Air Force is investing in technologies as part of a family of capabilities enabling air dominance in the most challenging operational environments. Air superiority underpins joint force operations in every theater, and evolving threats are forcing us to adapt both how we achieve it and how we build it. The FY21 budget requests $1 billion—and $6.6 billion across the FYDP—for Next Generation Air Dominance (NGAD). As future threats become increasingly difficult to predict, NGAD is employing digital engineering to replace once-in-a-generation, mass-produced fighters with smaller batches of iteratively-upgraded platforms of multiple types. Dubbed the "Digital Century Series," this approach takes a cue from the digital transformation of the automotive industry, using high-fidelity models to troubleshoot design, assembly, maintenance, and cost before physical systems exist. The goal is to end the learning curve cost of modernization so future aircraft—as well as satellites and weapons—can rapidly adapt to changing threats in a way legacy Major Defense Acquisition Programs cannot. We are excited about our progress and look forward to sharing the details with Congress in a classified setting.

Trainers

T-1, T-6, and T-38

The Department of the Air Force continues to modernize its trainer platforms as a vital component of readiness. We will divest the T-1 fleet starting in FY23 to enable full investment in Pilot Training Next, a new training paradigm that uses immersive technologies, such as artificial reality, to improve how we train pilots. We are investing in

an enhanced On-Board Oxygen Generation System, crash-survivable recorder, and numerous improvements to the T-38 such as front canopy replacements, until the T-7A "Red Hawk" delivers. The T-7A will replace Air Education and Training Command's existing fleet of 427 T-38C aircraft with 351 new trainers including all associated simulators, ground equipment, spares, and support equipment. The T-7A will better prepare student pilots with the skills and competencies required to transition into 4th and 5th generation fighter and bomber aircraft. Our FY21 budget requests $4.5 million, $28.7 million, $43.0 million, and $249 million for the T-1, T-6, T-38, and T-7A fleets, respectively.

Air Force Pilot Training Next initiative and implementation

Pilot Training Next (PTN) uses new technology to build better pilots more efficiently through the use of on-demand/on-command academics, Artificial Intelligence (AI)-enabled learning and competency-based progression. The Department of the Air Force is growing the PTN initiative to the entire enterprise in approximately four years through the rollout of Undergraduate Flight Training 2.5. This program will help augment training as T-1 retirement begins in FY23.

Current and Forecasted Pilot and Aircrew Shortfalls and Mitigation Strategies

As of FY19, the Department of the Air Force is approximately 2,100 pilots short of the required 20,850 Total Force manned pilots. We remain focused on decreasing the shortage of pilots through a combination of production and retention efforts. Training initiatives have enabled the Department of the Air Force to increase Undergraduate Pilot Training (UPT) production from 1,112 in FY16 to an estimated 1,300 graduates in FY20. This year's goal is 1,480 pilots.

Increased UPT production is a key component of the pilot recovery plan; however, achieving pilot manning health also requires robust and effective retention efforts to ensure we have a sustainable force. While Initial Aviation Bonus acceptance rates have stabilized at forty-four percent over the last three years after a steady decline between FY13 and FY17, rates are still below the necessary levels. To further increase retention, we are focusing on improving both quality of service and quality of life, and reducing administrative burdens in operational squadrons, the number of 365-day deployments, and the deployment of limited specialties to staff assignments.

Rotorcraft

The FY21 budget continues investment in the Department of the Air Force's critical rotorcraft modernization programs, including the CV-22 Osprey, HH-60G, HH-60W Jolly Green II, and MH-139A Grey Wolf programs.

The FY21 budget requests $147.3 million for the CV-22 fleet to support our special operations forces. The Department of the Air Force continues to make improvements to the CV-22 with modifications to improve reliability, survivability, and capability. Future efforts will make CV-22 sustainment more cost-effective while ensuring the viability of its unique long-range payload capacity coupled with vertical take-off and landing flexibility.

The Department of the Air Force is the only Service with a dedicated force organized, trained, and equipped to execute theater-wide Personnel Recovery. The HH-60G fleet currently accomplishes this mission by conducting day and night Combat Search and Rescue operations to recover isolated personnel in hostile or permissive environments. Due to the advancing age and current attrition rates of the HH-60G, the Department of the Air Force must continue to modify existing HH-60G helicopters while using the Operational Loss Replacement program to

meet Combatant Command requirements until we can fully recapitalize with the HH-60W Jolly Green II. The FY21 budget requests $46.4 million and $1.2 billion for the HH-60G and HH-60W programs, respectively. This budget request adds 19 HH-60W aircraft, increasing the total to 76 HH-60Ws within the FYDP. Testing of the new HH-60W Jolly Green II is progressing on schedule to support the next acquisition program milestone, Required Assets Available, by April of 2021.

The MH-139A helicopter is a critical element of both Department of the Air Force nuclear modernization and operational airlift within the National Capital Region. Last December, the Department of the Air Force received its first MH-139A to initiate developmental testing with first flight on 11 February 2020. The program will deliver up to 84 replacement helicopters, training devices, and associated support equipment to replace the legacy UH-1Ns. The FY21 budget requests $256.9 million for the MH-139A program, which will fund the continued integration of non-developmental items, non-recurring engineering work required to certify the modified air vehicle, initiation of the test program, and procurement of 8 MH-139As for low rate initial production.

Munitions

While the operational demand for munitions continues, our FY21 budget requests funds to replenish expenditures and enable sufficient production to reach desired inventory levels. This budget request also funds more lethal weapons to meet future operational requirements in support of the National Defense Strategy. Thanks to the strong support of Congress, our munitions posture continues the previous gains in munitions and emphasizes the advanced munitions most-relevant to the high-end fight.

The Advance Medium-Range Air-to-Air Missile (AMRAAM) is our premier air-to-air missile providing the air dominance the Joint Force requires. The FY21 budget requests $453 million for 414 missiles, including obsolescence mitigation through the Form Fit Function Refresh (F3R) at the end of FY21. This budget request continues to ramp production through FY25.

The Joint Air-to-Surface Standoff Missile (JASSM) is our premier standoff air-to-ground missile for holding threats in highly-contested environments at risk. The FY21 budget requests $506.4 million to procure 400 missiles, which includes the introduction of our first AGM-158D JASSM missiles, incorporating weapon enhancements and obsolescence mitigation in a single update. With Congressional support, the JASSM production facility expansion which began in 2019 will enable up to a forty-seven percent increased production rate by 2025.

The Stand-In Attack Weapon (SiAW) is a new air-to-ground weapon for our penetrating systems to defeat the rapidly relocatable targets that enable adversary contested environments. The FY21 budget requests $160.4 million—and $1.06 billion across the FYDP—to develop this new system.

The Joint Direct Attack Munition (JDAM) is our high-quantity, air-to-ground weapon of choice because of its accuracy, reliability, and effectiveness. The JDAM program delivered over 46,000 guidance tailkits in FY19 to meet the needs of the Joint Force and Foreign Military Sales (FMS) partners. The Department of the Air Force also received an Urgent Operational Need (UON) for an advanced variant, known as SABR-Y, which incorporated enhanced GPS jamming resistance. We plan to order 25,000 tailkits in FY20 with future procurements shifting completely to the advanced SABR-Y variant. The FY21 budget requests $448 million for 10,000 tailkits to maintain desired inventories.

Small Diameter Bomb I (SDB I) provides reduced collateral damage and increased load-outs per sortie. The Department of the Air Force had increased production in previous fiscal years to replace depleted stockpiles, but as we approach desired inventory levels, procurement is being reduced to match operational need. The FY21 budget requests $96 million for 2,462 weapons, making the remaining production capacity available to FMS partners.

The SDB II program, which provides improved capability against mobile targets, completed Initial Operational Test and Evaluation in FY19. The FY21 budget requests $273 million to procure 1,133 weapons. We look forward to fielding this system and providing warfighters improved standoff, target flexibility, and resilience to adverse weather conditions.

Hellfire missiles provide a direct strike capability for our remotely-piloted aircraft and remain in high demand for day-to-day operations. The FY21 budget requests $184 million to procure 2,497 Hellfire missiles to meet operational requirements.

Intelligence, Surveillance, and Reconnaissance and Advanced Battle Management System

Intelligence, Surveillance, and Reconnaissance (ISR) is critical to our national security, now and in the future. As we maintain current systems, we must meet the challenges of a highly-contested environment. Consequently, our FY21 budget funds a future ISR portfolio with multi-domain, multi-intelligence capabilities, many of which must remain classified to maintain our advantage against peer adversaries. We appreciate Congressional support and willingness to meet in classified fora to understand and oversee these efforts.

The most critical element of maintaining ISR, and more broadly warfighting dominance, is the Advanced Battle Management System (ABMS). Charged by the Secretary of Defense with leading concept development for Joint All-Domain Command and Control, the Department of

the Air Force is building a militarized internet of things (IoT), called ABMS, to connect any sensor with any shooter—across all domains—with the required digital infrastructure for data analyties and artificial intelligence to fight at machine speeds.

Because of the complexity, risk must be retired more quickly and routinely than traditional programs to avoid "snowballing" and failure. Taking a cue from DevSecOps, which iteratively deploys thin "slices" of minimally-viable code that stack into greater capabilities while providing invaluable user feedback each cycle, ABMS will deploy military IoT-type connectivity—things like cloud, data management, and software-defined radios and networks—in hardware-software slices designed for upgradeability, vice point performance. Concepts and systems will be iterated in four-month cycles culminating in live-fly experiments.

Our first experiment in December 2019 connected Air Force aircraft, Space Force sensors, Navy surface vessels and aircraft, Army air defense and fire units, and a Special Operations Team for the successful defeat of a simulated cruise missile. Led by U.S. Northern Command, 26 of 28 connectivity objectives were met, including the first connection of an F-35 with an F-22 via a translating gateway called "gatewayONE." The failures, however, were more important than the successes as failing and fixing fast is the core acquisition principle.

Our Department of the Air Force FY21 budget request includes additional resources for ABMS and its digital backbone (Enterprise Information Technology as a Service) comprised of 28 development projects, such as the aforementioned gatewayONE, and continued experimentation. Sponsored by U.S. Space Command, U.S. Northern Command, and U.S. Strategic Command the next experimentation event is planned for this April. We are committed to working with our Joint and Allied Partners so that existing systems can join easily. We ask

Congress to continue to support this capability so that future operators on the battlefield enjoy the same empowered connectivity they presently enjoy at home.

As we build ABMS, we must also sustain and modernize existing platforms to connect with it. The E-3 and E-8C aircraft fleets currently provide airborne command and control and Moving Target Indication capability for operations outside of the contested environment. Our FY21 budget continues to invest in the E-3 fleet through multiple upgrades, including the Block 40/45 mission system upgrade, the DRAGON flight deck modernization, and Mobile User Objective SATCOM radio integration, to ensure it can continue to support current operational requirements, meet air traffic control mandates, and sustain availability rates. For the E-8C, the Department of the Air Force continues to implement efforts to increase operational availability and ensure aircraft viability into the future. Our FY21 budget funds Common Data Link integration and procurement of modern ARC-210 Gen 6 radios. We remain committed to providing six deployed E-8C aircraft to meet Combatant Commander needs.

MQ-9s have played an invaluable role in the figbt against Violent Extremist Organizations, but consistent with the National Defense Strategy, we must begin retiring these aircraft to free resources for next-generation capabilities. Our FY21 budget request retires ten MQ-9 combat lines—reducing annual operations and maintenance costs by $237 million—and shuts down the production line in FY21. The production line shutdown will save $563 million across the FYDP, freeing funds for next-generation systems, while still providing sufficient MQ-9 inventories to support combat requirements into the 2030s. While reducing quantity, our budget request includes $679 million to improve the quality of the fleet. Modernizations include a new Full Motion Video sensor, range enhancements, and automated take-off and landing.

Additionally, the MQ-9 program is mitigating the operational and maintenance impacts of sustaining a multi-configuration fleet by moving to a Block 5-only fleet operated solely by Block 30 Ground Control Stations.

The RC-135 fleet provides important signals intelligence in support of operations and in uncontested environments. Our FY21 budget requests $280 million for fleet-wide improvements such as automation of additional search and detection, improved near-real-time data processing and distribution, and artificial intelligence-aided data exploitation. Our partnership with the United Kingdom's Royal Air Force on the RC-135 continues to set the standard for cooperative efforts that strengthen alliances while increasing partner interoperability.

The RQ-4 Global Hawk provides high-altitude, long-endurance, all-weather, wide-area reconnaissance and surveillance. In support of the National Defense Strategy, we will divest our four Block 20 aircraft and the twenty RQ-4 Block 30 aircraft to free resources for systems capable of operating in contested environments. While this decision will save $2.45 billion total over the FYDP, including $815 million in investment dollar savings alone, the decrease in fleet size does not lessen our commitment to modernizing and sustaining the remaining 10 Block 40 aircraft. The FY21 budget request includes ground segment modernization and upgraded communications interoperability to ensure these platforms continue to provides Ground Moving Target Indicators in support of joint operations.

The U-2 provides ISR in support of missions in multiple theaters. The FY21 budget will retain the U-2 through FY25 as we develop new systems.

The Tactical Data Network Enterprise (TDNE) program moves data across our ISR enterprise and contains multiple development efforts directly supporting JADC2. This includes

Software-Programmable Open Mission System Compliant (SPOC) radios capable of hosting a variety of advanced non-proprietary waveforms while also ensuring backward compatibility and a gateway that will provide data-sharing capability between 5th and 4th generation platforms. It is critical that all programs and platforms prepare for integration with ABMS to ensure data can flow between any sensor and shooter at machine speeds.

It is critical that these ISR systems, and other platforms, prepare for integration with ABMS to ensure data can flow between any sensor and shooter at machine speeds. As we continue our four-month integration exercises for ABMS, we are committed to keep Congress informed on progress to build confidence the approach and deliver this important capability for the future fight.

Faster, Smarter Acquisitions and Future Capability

Competing against rising peer adversaries during this time of unprecedented technology change requires a competitive acquisition system: one that is faster and more agile than our rivals. Consequently, the Department of the Air Force is transforming what we buy, how we buy, and who we buy from to retain the battlefield dominance we presently enjoy. In addition to JADC2 powered by ABMS—the backbone of the future Joint Force—there are numerous future-oriented efforts helping us stay ahead of evolving threats.

Faster Acquisitions

Fielding systems faster is step one. Through rapid prototyping authorities granted by Congress, such as Middle Tier Acquisition, we are trimming non-value-added steps that previously bogged down programs and slowed capability to warfighters. In May 2019, we achieved our goal of removing 100 years of excess time from program schedules. Since then, we have reached 125 years on our way to 150 this summer. Rapid prototyping—"flying before you

buy"—is not just a faster acquisition approach; it allows risks to be tackled earlier, before systems are in production when there is still time to troubleshoot. The benefit is proving out in our 55 MTA programs, which maintain the same documentation and discipline as traditional programs. We thank Congress for this invaluable authority and will continue to report our status regularly.

DevSecOps software development is fundamentally changing how we deliver digital capabilities to warfighters. With the establishment of our Program Executive Office for Digital, Chief Software Officer, and over 60 agile coding teams spanning both traditional programs (e.g., F-16, F-22, and B-21) and new development "factories" (e.g., Kessel Run, Kobayashi Maru, Space Camp, and LevelUp) the Department of the Air Force is scaling modern software practices where cycle times are now weeks, even days. Kessel Run, a fantastic example of what Section 804 authorities helped accomplish, has deliver 26 capabilities to over 10,000 users in the Air Operations Centers that are updated every 11 hours on average. To accelerate even further, we are fielding common infrastructure that all programs can leverage. Cloud One, our enterprise cloud, and two coding platforms, Platform One and the Kessel Run platform, currently provide enterprise-wide coding environments employing leading commercial technologies, such as containerization and Kubernetes, increasing the reliability and security of our code. Programs like F-16, F-22, B-21, and Ground-Based Strategic Deterrent (GBSD) are leveraging this pre-accredited infrastructure to develop faster and more securely.

Another accelerant is digital engineering, which is revolutionizing the design and production agility of new programs like T-7A, GBSD, and NGAD. The aforementioned "Digital Century Series" is the Department's first attempt to leverage this technology to build smaller batches of upgradable systems to provide the future Force greater ability to ingest technology.

Another accelerant is our new Vanguard program: a new initiative designed to accelerate technology from our Air Force Research Laboratory into programs of record, modeled after the prototyping process used by the Strategic Capabilities Office. We recently approved the first three vanguards: Navigation Technology Satellite 3 (NTS-3), Skyborg, and Golden Horde.

NTS-3 is the first Satellite Navigation (SATNAV) space experiment in 40 years. The program will develop advanced techniques to provide military, civil, and commercial users with a more resilient SATNAV capability. If successful, these techniques will transition to future generations of the Global Positioning System (GPS) satellites and receivers. Launch of NTS-3 is currently projected for 2023 with a planned one-year, on-orbit experimentation program.

Skyborg integrates Artificial Intelligence (AI) with autonomous Unmanned Air Vehicles (UAVs) to enable manned-unmanned teaming. AI technologies, ranging from simple algorithms to fully autonomous flight controls, will be worked in partnership with our AI Accelerator at the Massachusetts Institute of Technology. If successful, Skyborg will transition AI-enabled low-cost attritable aircraft technology (LCAAT) via the NGAD program or new program of record. The first LCAAT, the XQ-58A Valkyrie, has already demonstrated high subsonic speeds at operationally relevant altitudes and payload capacities. Its next flight in April 2020 will connect the F-22 and F-35 via the gatewayONE radio link as part of the next ABMS demonstration.

Golden Horde will demonstrate collaborative, semi-autonomous networked weapons that share data, interact, and execute coordinated actions to defeat targets. Golden Horde will leverage onboard radios and algorithms to share data between weapons as well as manned platforms. Flight testing with existing weapons will begin this year, and, if successful, those weapons programs will transition Golden Horde upgrades into their respective programs of record.

Smarter Acquisitions

Faster acquisitions go hand-in-hand with smarter ones. Leveraging new technologies and new industry practices that increase program quality and agility is essential to compete long-term. One area of smarter acquisition not often highlighted is sustainment innovation. The average aircraft flown by the Air Force is 23 years old, and systems like the C-5, KC-135, and B-52 are even older at 33, 58, and 58 respectively. These aging fleets face significant readiness challenges as approximately sixty percent of their supply chain is single-source or, increasingly, unsourced. To fill the gap, our Rapid Sustainment Office is developing, transitioning, and training Department of the Air Force maintainers to use technologies found in smart manufacturing. Artificial intelligence, robotics, and additive manufacturing (i.e., 3-D printing) are now being used at scale to lower costs and speed-up repairs for our warfighters. To date, the Department of the Air Force has certified over 2,000 additively manufactured parts, cold spray repairs at our depots, and predictive maintenance for five systems with 11 more joining this year—saving cost while increasing readiness. This summer we will host our first Advanced Manufacturing Olympics, a challenge-based competition showcasing current fleet readiness problems and awarding contracts to organizations who solve them. We are excited to take the next step in on-demand manufacturing with new industry and academia partnerships.

Another area of smarter acquisition is our work with startups, small businesses, and private investors. With over eighty percent of our nation's research and development (R&D) now commercial—and our Defense Industrial Base continuing to shrink through mergers and acquisitions—transforming the way we work with commercial companies is imperative. In 2018, we began energizing our Small Business Innovative Research/Small Business Technology Transfer Program (SBIR/STTR) to lower barriers for commercial tech companies, speed

contracts, and bring private investment into the Defense market. In 2019 alone, we awarded over 1,000 contracts worth $240 million to 700 companies, with over half new to the government; conducted 15 "Pitch Days" that awarded $77 million in same-day contracts; and induced over $400 million of private investment matching for companies receiving Department of the Air Force awards. With more improvements coming this year, we will formally launch this new "Air Force Ventures" process at scale so that tech companies can depend on us as an early innovation partner of choice.

Another example of smarter acquisition is Agility Prime, a non-traditional program seeking to operationalize commercial electric vertical takeoff and landing (eVTOL) vehicles (i.e., "flying cars") for military missions and potentially accelerating the emerging commercial market. The Department of the Air Force has unique testing and safety resources—and revenue-generating military use cases—to help mitigate present commercial market and regulatory risks. Agility Prime will use these resources, vice significant R&D funding, to attract investors, build confidence, and hopefully expedite commercialization, all while providing warfighters with revolutionary flexibility for numerous missions. Transforming our acquisition system from a mere purchaser to an innovation partner is key for accelerating dual-use technology and countering the advantages of state-sponsored industrial bases. We appreciate the support of Congress on this effort, including the additional $25 million it appropriated in the FY20 Defense Bill.

Conclusion

Thank you again for the opportunity to testify before this Subcommittee. The dialogue we have today will help us design, build, and operate a force capable of fighting and winning now and in the future. Our adversaries are not standing by idle; neither must we.

Dr. Will Roper

Dr. Will Roper is the Assistant Secretary of the Air Force for Acquisition, Technology and Logistics. As the Air Force's Service Acquisition Executive, Dr. Roper is responsible for and oversees Air Force research, development and acquisition activities totaling an annual budget in excess of $40 billion for more than 465 acquisition programs. In this position, Dr. Roper serves as the principal advisor to the Secretary and Chief of Staff of the Air Force for research and development, test, production and modernization efforts within the Air Force. In addition to his Air Force responsibilities, Dr. Roper is the Service Acquisition Executive for the Joint Strike Fighter.

Prior to his current position, Dr. Roper was the founding Director of the Pentagon's Strategic Capabilities Office. Established in 2012, the SCO imagines new—often unexpected and game-changing—uses of existing government and commercial systems: extending their shelf-life and restoring surprise to the military's playbook. Since 2012, SCO has grown from an annual budget of $50 million to the current $1.5 billion request in the President's 2018 budget with projects spanning new concepts such as hypervelocity artillery, multi-purpose missiles, autonomous fast-boats, smartphone-navigating weapons, big-data-enabled sensing, 3D-printed systems, standoff arsenal planes, fighter avatars and fighter-dispersed swarming micro-drones which formed the world's then-largest swarm of 103 systems. During his tenure as SCO Director, Dr. Roper served on the Department's 2018 National Defense Strategy Steering Group, Cloud Executive Steering Group and Defense Modernization Team.

Previously, Dr. Roper served as the Acting Chief Architect at the Missile Defense Agency where he developed 11 new systems, including the current European Defense architecture, advanced drones, and classified programs. Before this, he worked at MIT Lincoln Laboratory and served as a missile defense advisor to the Under Secretary of Defense for Acquisition, Technology and Logistics.

EDUCATION
2001 Bachelor of Science in Physics, Georgia Institute of Technology, Atlanta
2002 Master of Science in Physics, Georgia Institute of Technology, Atlanta
2010 Doctorate in Mathematics, Oxford University, England

CAREER CHRONOLOGY
January 2006 – June 2010, Missile Defense Advisor, MIT Lincoln Laboratory, Washington, D.C.
August 2010 – August 2011, Member, Missile Defense Advisory Committee, Missile Defense Agency, Washington D.C.
June 2010 – August 2012, Acting Chief Architect, Missile Defense Agency, Washington D.C.
August 2012 – February 2018, Director, Strategic Capabilities Office, Office of the Secretary of Defense, Washington, D.C.
February 2018 – present, Assistant Secretary of the Air Force for Acquisitions, Technology and Logistics, Headquarters U.S. Air Force, Washington, D.C.

MAJOR AWARDS AND HONORS
Department of Defense Medal for Distinguished Public Service
Secretary of Defense's Award for Excellence
USD/AT&L Award for Innovation
MDA Contractor of the Year
MDA Innovation and Technology Awards
Rhodes Scholar

(Current as of August 2019)

General James M. Holmes

Gen. James M. "Mike" Holmes is the Commander, Air Combat Command, Joint Base Langley-Eustis, Virginia. As the commander, he is responsible for organizing, training, equipping and maintaining combat-ready air, space, cyber and intelligence forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime defense. The command operates more than 1,000 aircraft, 35 wings, 11 bases, and 1,348 units at more than 300 operating locations worldwide with 159,000 total force military and civilian personnel. As the Combat Air Forces lead agent, ACC develops strategy, doctrine, concepts, tactics, and procedures for air-, space-, and cyber-power employment. The command provides conventional and information warfare forces to all unified commands to ensure air, space, cyber, and information superiority for warfighters and national decision-makers. The command can also be called upon to assist national agencies with intelligence, surveillance and crisis response capabilities.

General Holmes entered the Air Force through Officer Training School in 1981 after receiving a degree in electrical engineering from the University of Tennessee. He has commanded the 27th Fighter Squadron, the 14th Operations Group, the 4th Fighter Wing and the 455th Air Expeditionary Wing. He has served in the Office of the Secretary of Defense and on headquarters staffs of the United States Air Force, U.S. European Command and Pacific Air Forces. Prior to his current position, he served as the Deputy Chief of Staff for Strategic Plans and Requirements, Headquarters U.S. Air Force, Arlington, Va.

He is a command pilot with more than 4,000 hours, including over 530 combat hours in the F-15A/B/C/D/E, and has also flown the T/AT-38, T-37, and T-1A.

EDUCATION

1981 Bachelor of Science degree in electrical engineering, University of Tennessee, Knoxville
1986 F-15 Fighter Weapons Instructor Course, U.S. Air Force Fighter Weapons School, Nellis AFB, Nev.
1987 Squadron Officer School, Maxwell Air Force Base, Ala.
1993 Air Command and Staff College, Air University, Maxwell AFB, Ala.
1993 Master of Arts degree in history, University of Alabama, Tuscaloosa
1994 Master of Airpower Arts and Sciences degree, School of Advanced Airpower Studies, Air University, Maxwell AFB, Ala.
1995 Armed Forces Staff College, Norfolk, Va.
2000 Air War College, by correspondence
2001 Master's degree in national defense studies, Naval War College, Newport, R.I.
2006 National Defense Studies Fellow, Maxwell School of Citizenship and Public Affairs, Syracuse University, N.Y.
2007 Joint Force Air Component Commander Course, Air University, Maxwell AFB, Ala.
2010 AFSO21 Executive Leadership Course, University of Tennessee, Knoxville
2011 Coalition Force Maritime Component Commander Course, Naval War College, Bahrain
2013 Joint Flag Officer Warfighting Course, Air University, Maxwell AFB, Ala.
2018 Leadership at the Peak, Center for Creative Leadership, Colorado Springs, Colo.

ASSIGNMENTS

September 1981 - August 1982, student, undergraduate pilot training, Columbus AFB, Miss.
September 1982 - November 1982, student, fighter lead-in training, Holloman AFB, N.M.
November 1982 - April 1983, student, F-15 conversion training, Luke AFB, Ariz.
May 1983 - December 1985, F-15 instructor pilot and Assistant Squadron and Wing Weapons Officer, 71st Tactical Fighter Squadron, Langley AFB, Va.
January 1986 - May 1986, student, USAF F-15 Fighter Weapons Instructor Course, Nellis AFB, Nev.
May 1986 - May 1989, F-15 Chief of Weapons and Tacties, 44th Tactical Fighter Squadron, Kadena Air Base, Japan

May 1989 - June 1992, F-15 Chief of Weapons and Tactics, Assistant Chief of Wing Weapons and Tactics, Flight Commander and Assistant Operations Officer, 7th Tactical Fighter Squadron and 9th Fighter Squadron, Holloman AFB, N.M.
July 1992 - June 1993, student, Air Command and Staff College, Air University, Maxwell AFB, Ala.
July 1993 - June 1994, student, School for Advanced Airpower Studies, Air University, Maxwell AFB, Ala.
July 1994 - October 1996, Air Operations Officer and Crisis Action Planner, Operations Directorate, Headquarters U.S. European Command, Stuttgart-Vaihingen, Germany
October 1996 - December 1997, Assistant Operations Officer, 27th Fighter Squadron, Langley AFB, Va.
January 1998 - May 1999, Operations Officer, 71st Fighter Squadron, Langley AFB, Va.
May 1999 - July 2000, Commander, 27th Fighter Squadron, Langley AFB, Va.
July 2000 - July 2001, student, Naval War College, Newport, R.I.
July 2001 - August 2002, Chief, Strategy, Concepts and Doctrine Division, Directorate of Operational Plans and Joint Matters, Headquarters U.S. Air Force, Arlington, Va.
August 2002 - July 2004, Commander, 14th Operations Group, Columbus AFB, Miss.
August 2004 - September 2006, Commander, 4th Fighter Wing, Seymour Johnson AFB, N.C.
September 2006 - June 2007, Chief, Checkmate, Directorate of Operational Plans and Joint Matters, Headquarters U.S. Air Force, Arlington, Va.
July 2007 - December 2007, Director of Strategic Plans, Programs and International Affairs, Headquarters Pacific Air Forces, Hickam AFB, Hawaii
December 2007 - March 2008, Special Assistant to the Director of Operational Planning, Policy and Strategy, Deputy Chief of Staff for Operations, Plans and Requirements, Headquarters U.S. Air Force, Arlington, Va.
March 2008 - April 2009, Commander, 455th Air Expeditionary Wing, Bagram Air Base, Afghanistan
April 2009 - July 2009, Special Assistant to the Assistant Vice Chief of Staff, and Director, Air Staff, Headquarters U.S. Air Force, Arlington, Va.
July 2009 - August 2011, Principal Director for Middle East Policy, Office of the Under Secretary of Defense for Policy, Office of the Secretary of Defense, the Pentagon, Arlington, Va.
August 2011 - January 2012, Director, Strategic Planning, Deputy Chief of Staff for Strategic Plans and Programs, Headquarters U.S. Air Force, Arlington, Va.
January 2012 – July 2013, Assistant Deputy Chief of Staff for Operations, Plans and Requirements, Headquarters U.S. Air Force, Arlington, Va.
August 2013 - July 2014, Vice Commander, Air Education and Training Command, Joint Base San Antonio- Randolph, Texas
August 2014 - March 2017, Deputy Chief of Staff for Strategic Plans and Requirements, Headquarters U.S. Air Force, Arlington, Va.
March 2017 - present, Commander, Air Combat Command, Joint Base Langley-Eustis, Va.

SUMMARY OF JOINT ASSIGNMENTS
July 1994 - October 1996, Air Operations Officer and Crisis Action Planner, Operations Directorate, Headquarters U.S. European Command, Stuttgart-Vaihingen, Germany, as a major
March 2008 - April 2009, Commander, 455th Air Expeditionary Wing and Senior Airfield Authority, Bagram AB, Afghanistan, as a brigadier general
July 2009 - August 2011, Principal Director for Middle East Policy, Office of the Under Secretary of Defense for Policy, Office of the Secretary of Defense, the Pentagon, Arlington, Va., as a brigadier general

FLIGHT INFORMATION
Rating: command pilot
Flight hours: More than 4,000, including over 530 combat hours
Aircraft flown: F-15A/B/C/D/E, T/AT-38, T-37 and T-1A

MAJOR AWARDS AND DECORATIONS
Distinguished Service Medal
Defense Superior Service Medal
Legion of Merit with oak leaf cluster
Bronze Star Medal
Defense Meritorious Service Medal

Meritorious Service Medal with two oak leaf clusters
Air Medal with three oak leaf clusters
Aerial Achievement Medal with three oak leaf clusters
Air Force Commendation Medal with oak leaf cluster
Army Commendation Medal

PUBLICATIONS

1994 The Counterair Companion, A Short Guide to Air Superiority for Joint Force Commanders, School of Advanced Airpower Studies, Air University, Maxwell AFB, Ala.
2018 Multidomain Battle: Converging Concepts Toward a Joint Solution, Joint Force Quarterly 88

EFFECTIVE DATES OF PROMOTION

Second Lieutenant Aug. 28, 1981
First Lieutenant Aug. 28, 1983
Captain Aug. 28, 1985
Major May 1, 1993
Lieutenant Colonel Jan. 1, 1998
Colonel July 1, 2002
Brigadier General May 2, 2008
Major General Jan. 28, 2011
Lieutenant General Aug. 2, 2013
General March 10, 2017

(Current as of December 2018)

Lieutenant General David S. Nahom

Lt. Gen. David S. Nahom is the Deputy Chief of Staff for Plans and Programs, Headquarters U.S. Air Force, the Pentagon, Arlington, Virginia. In support of the Chief of Staff and Secretary of the Air Force, he leads the development and integration of the Air Force resource allocation plan. As the Air Force's senior programmer, he leads the development, integration, evaluation and analysis of the Air Force Program across the Future Years Defense Plan. He directs and coordinates activities ensuring the Air Force builds and employs effective air, space and cyber forces to achieve national defense objectives.

Lt. Gen. Nahom was commissioned through the Reserve Officer Training Corps at the University of Colorado and is a distinguished graduate of both undergraduate navigator training and Euro-NATO Joint Jet Pilot Training. During his 31-year active duty Air Force career, the general commanded at the squadron, group and wing level and is a command pilot with more than 3,400 hours in the F-22A,Raptor, F-15A/B/C/D Langley-Eustis, Va. Eagle and F-111F Aardvark.

In addition to his flying and command experience, Lt. Gen. Nahom is a graduate of the U.S. Army Command and General Staff College and the NATO Defense College. He has held headquarters-level assignments at NATO Combined Air Operations Center Six, U.S. Forces Korea, Pacific Air Forces, Headquarters Air Force and Air Forces Central Command. Prior to his current assignment, the general was the Director of Programs, Office of the Deputy Chief of Staff for Plans and Programs, Headquarters Air Force, the Pentagon, Arlington, Virginia.

EDUCATION
1988 Bachelor of Arts, Economics, University of Colorado, Boulder
1993 Squadron Officer School, Maxwell Air Force Base, Ala.
2001 Army Command and General Staff College, Fort Leavenworth, Kan.
2001 Master of Military Operational Arts and Science, Fort Leavenworth, Kan.
2006 Air War College, Maxwell AFB, Ala., by correspondence
2009 NATO Defense College, Rome, Italy

ASSIGNMENTS
November 1988-August 1989, Student, Specialized Undergraduate Navigator Training, Mather Air Force Base, Calif.
September 1989- October 1989, Student, AT-38 Fighter Lead-In Training, 436th Tactical Fighter Training Squadron, Holloman AFB, N.M.
November 1989- May 1990, Student, F-111 Replacement Training Unit, Mountain Home AFB, Idaho
June 1990- February 1993, F-111F Weapons Systems Officer, 492nd TFTS, RAF Lakenheath, United Kingdom
March 1993- July 1994, Student, Euro-NATO Joint Jet Pilot Training, Sheppard AFB, Texas
August 1994- October 1994, Student, Introduction to Fighter Fundamentals, Columbus AFB, Miss.
November 1994- June 1995, Student, F-15C Fighter Training Unit, Tyndall AFB, Fla.
July 1995-September 1997, Aircraft Commander, Mission Commander, 71st Fighter Squadron, Joint Base Langley-Eustis, Va.
September 1997-December 1999, Flight Lead, Chief Squadron Scheduler, Operations Support Squadron, JB Langley-Eustis, Va.
December 1999--June 2000, F-15C Instructor Pilot, Assistant Director of Operations, 95th FS, Tyndall AFB, Fla.
June 2000-July 2001, Student, Army Command and General Staff College, Fort Leavenworth, Kan.
September 2002--June 2003, Chief Wing Training, F-15C Instructor Pilot, 33rd Operations Support Squadron, Eglin AFB, Fla.
June 2003-August 2005, Assistant Director of Operations, Director of Operations, 60th FS, Eglin AFB, Fla.

August 2005-June 2006, Chief of Wing Safety, 33rd Fighter Wing, Eglin AFB, Fla.
June 2006-August 2008 Commander, Deputy Commander for Maintenance Group, 60th FS, Eglin AFB, Fla.
July 2008-January 2009, Student/Senior Course Member, NATO Defense College, Rome, Italy
June 2010-July 2012, Commander, 18th Operations Group, Kadena Air Base, Japan
July 2012-March 2013, Executive Officer to Commander Pacific Air Forces, JB Pearl Harbor-Hickam, Hawaii
March 2013-August 2014, Commander, 3rd Wing, JB Elmendorf-Richardson, Alaska
September 2014-October 2015, Director of Regional Affairs, Deputy Under Secretary of the Air Force, International Affairs, Headquarters Air Force, Arlington, Va.
November 2016-April 2017, Deputy Director of Plans, Programs and Requirements, JB Langley-Eustis, Va.
April 2017-May 2018, Deputy Commander, US Air Forces Central Command; Deputy, Combined Force Air Component Commander, US Central Command, Southwest Asia
May 2018-September 2019, Director of Programs, Office of the Deputy Chief of Staff for Plans and Programs, Headquarters Air Force, the Pentagon, Arlington, Va.
September 2019-present, Deputy Chief of Staff, Plans and Programs, Headquarters Air Force, the Pentagon, Arlington, Va.

SUMMARY OF JOINT ASSIGNMENTS
July 2001-July 2002, Chief of Fighter Operations, NATO Combined Air Operations Six, Eskisehir, Turkey, as a major
February 2009-June 2010, Chief J37 Training, Readiness, and Exercises Division, U.S. Pacific Command, Yong San, Seoul, South Korea, as a colonel

FLIGHT INFORMATION
Rating: command pilot
Flight hours: more than 3,400
Aircraft flown: F-22A, F-15 A-D, AT-38, T-38, T-37 and F-111A/F

MAJOR AWARDS AND DECORATIONS
Defense Superior Service Medal with oak leaf cluster
Legion of Merit with oak leaf cluster
Distinguished Flying Cross with oak leaf cluster
Defense Meritorious Service Medal
Meritorious Service Medal with three oak leaf clusters
Air Medal with four oak leaf clusters
Aerial Achievement Medal with three oak leaf cluster
Air Force Commendation Medal with oak leaf cluster
Air Force Achievement Medal with two oak leaf clusters

EFFECTIVE DATES OF PROMOTION
Second Lieutenant Aug. 13, 1988
First Lieutenant Aug. 13, 1990
Captain Aug. 13, 1992
Major Dec. 1, 1999
Lieutenant Colonel April 1, 2004
Colonel July 1, 2009
Brigadier General Oct. 17, 2014
Major General June 2, 2018
Lieutenant General Sept. 4, 2019

(Current as of October 2019)

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 10, 2020

QUESTION SUBMITTED BY MR. BACON

Mr. BACON. In the hearing we heard a lot about the process that the USAF is using to pursue ABMS, but we did not hear much about specific timelines for capability delivery. Can you provide a specific timeline for when GMTI sensors are going to be available through ABMS to meet these growing needs and begin replacing legacy GMTI feeds?

Secretary ROPER and General HOLMES. The Air Force has completed the Advanced Battle Management System (ABMS) Moving Target Indicator (MTI) and Battle Management Command and Control (BMC2) Analysis of Alternatives (AOA) and released the Final Report to OSD CAPE for sufficiency review on 3 February 2020. The ABMS MTI and BMC2 AOA describes potential MTI capabilities, including GMTI, which is needed for operations in highly contested environments. The DAF will use the ABMS MTI and BMC2 AOA to develop plans for future MTI capability development which includes timelines and impacts to legacy MTI capabilities. The ABMS MTI and BMC2 AOA is scheduled for delivery to Congress in June 2020. We can provide a classified briefing with the details to Rep Bacon in the proper setting.